INDUSTRIAL-ARTS MAGAZINE

Vol. IV SEPTEMBER, 1915 No. 3

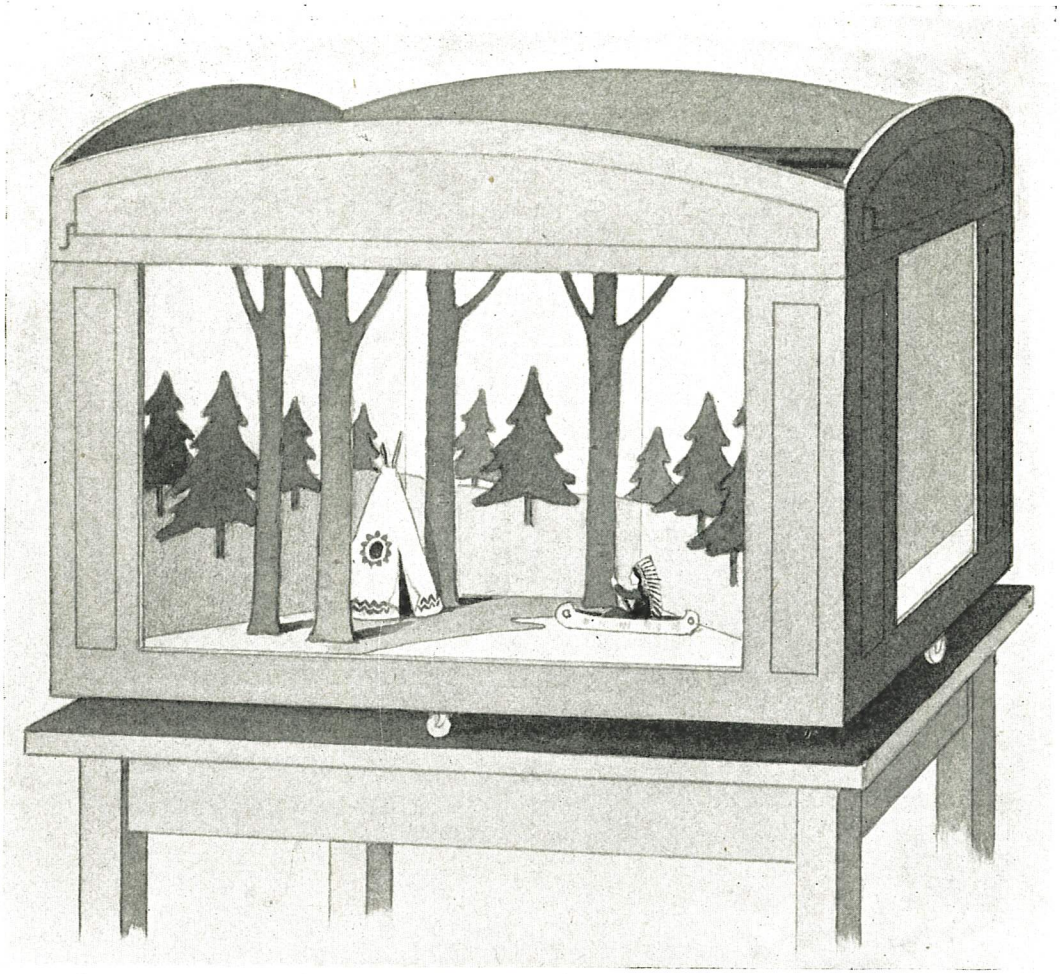


Plate I. The Theater Set on a Schoolroom Table.

A QUADRUPLEX SCHOOL THEATER

Hugo B. Froehlich, Director of Manual Arts, Newark, N. J.

TABLEAUX are always exciting. If you are bidden to this particular form of entertainment, you face at first a dead expanse of curtain, all concealing, yet stimulating your imagination, as you speculate upon what is behind. You hear the bustle of preparation. You wax impatient. Why doesn't the show begin? At last a bell rings, and the hush of expectancy falls upon the audience. As the curtain slowly rises, there is a prolonged "A-a-h!" of admiration. If you are in a proper state of sympathy and appreciation, you gaze spellbound, for a brief moment at a picture of living beauty. Perhaps—Oh, joy!—red lights are burned, and then, another bell, and the curtain slowly descends. It is all over!

Something of the dramatic interest of the tableau and the pageant may be experienced in the schoolroom thru the medium of the quadruplex school theater. The advantage of this particular device over the little theater in common use lies in the possibility of arranging four scenes or tableaux before the performance begins. Thus there are no long waits between the acts, when interest is suspended and restlessness prevails. After the first picture is shown, the next swings easily into position, carrying its own curtain, ready to be raised at the psychological moment. This is accomplished by giving the theater a quarter turn, on its central pivot. Plate 2 illustrates the device. The theater is placed upon four casters, and is fastened by a central pin or pivot to the center of a table. Diagonal parti-

PLATE II.
PLANS OF THE THEATER.

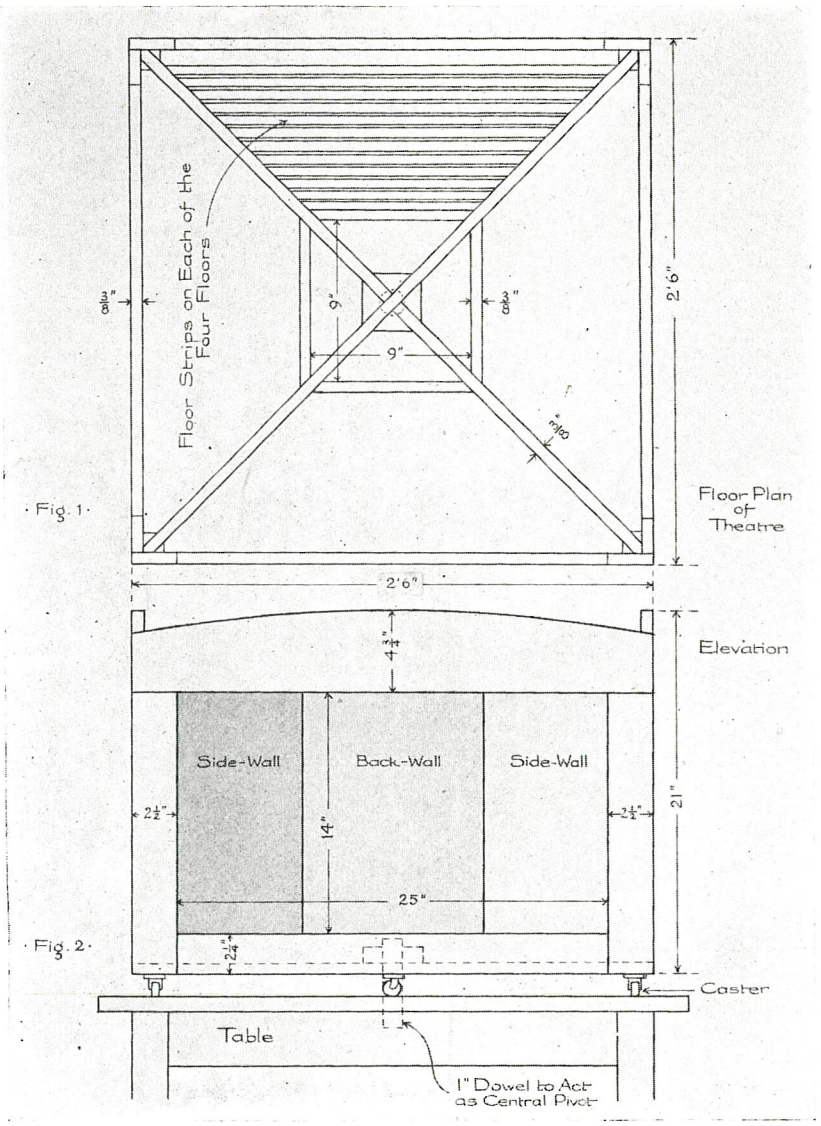
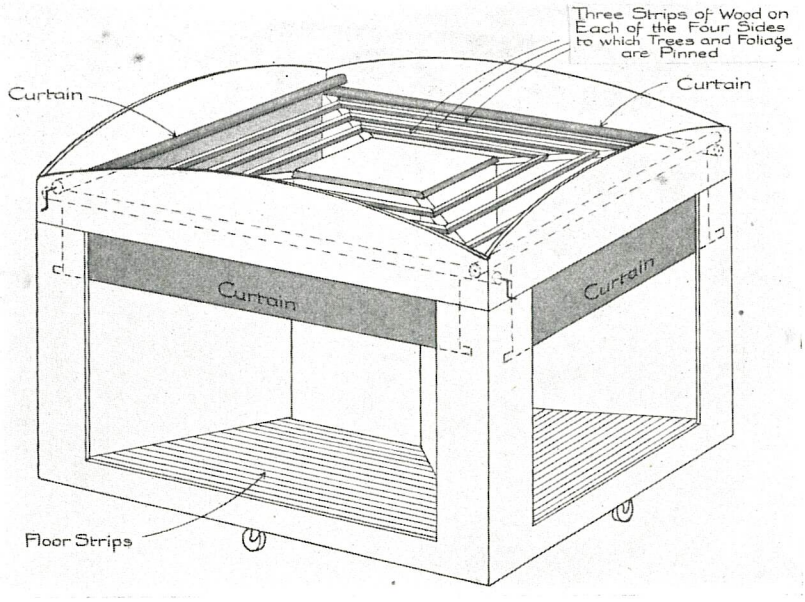


PLATE III.
PERSPECTIVE VIEW. TOP REMOVED TO SHOW CURTAINS, CEILING STRIPS, ETC.



tions divide the inside of the theater into four compartments. Each compartment consists of a nearly triangular floor space, and three walls,—a back wall and two slanting side walls. Plates 2 and 3 show the plan of construction. It is an excellent problem for eighth-grade boys, in the manual training department, and is especially adapted for group work. The theater is to be used in primary grades, and all settings and scenery are to be made, by the children, from cardboard and colored papers. This provides a definite use and to some extent, insures permanency for many exercises in paper and cardboard construction. Too often these products of the children's skill are consigned to the waste basket, their mission having been fulfilled in the making.

ing for the imagination than the crude and inartistic results obtained thru the medium of colored crayons and water colors? Try it and see!

Plate 1 shows the theater in position, presumably before a roomful of children. The curtain has been raised upon a tableaux arranged to show a scene from Hiawatha. The work of little fingers is clearly seen. The children have made paper landscape posters for the three walls of the theater. Each poster consists of a sky shape of blue paper, a foreground of green paper, and flat shapes of trees cut from dark green paper. These posters were made to fit the walls, and were pinned in place. The floor space was covered with an arrangement of bright blue and bright green paper, to illustrate the "Shores of Gitche Gumee" and the

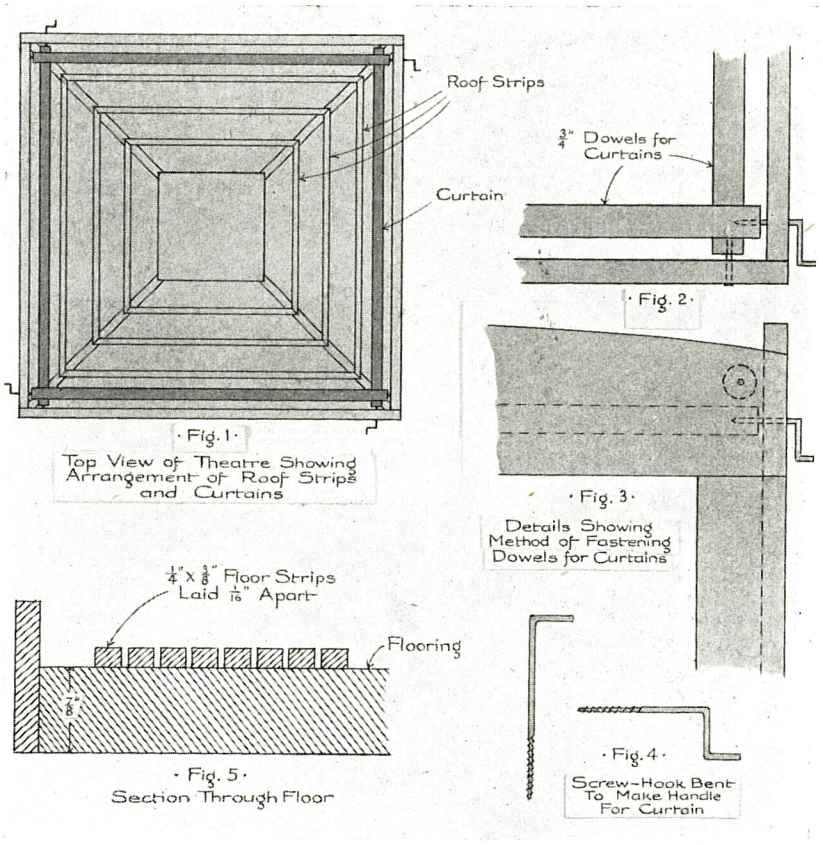


Plate IV. Details of Construction.

When the tableaux are once arranged, all the properties can be removed without injury, and placed in a labelled box, to be reinstalled in the theater when a repetition of the entertainment is desired. A delightful series of tableaux can be prepared and used again and again.

The preparation of these pictures seems a better outlet for the imaginative interests of children than the usual form of illustrative drawing. The medium of paper cutting permits shapes to be composed—that is, slipped around upon a background until the best arrangement is found. Flat shapes of fine color give us just the kind of decorative effect in the tableaux that Granville Barker, for instance, seeks to attain thru his costumes and stage settings. Is not this a better train-

"Shining Big-Sea Water". The tall tree trunks were cut from dark gray paper, their tops pinned to the strips of wood nailed for that purpose across the top of the theater (See Plate 3). Their bases were slipped in slits made in the foreground, between the strips of wood nailed across the floor. These strips are only a sixteenth of an inch apart, and their use is to hold objects upright, whose bases are slipped between them thru slits made in the paper foreground. In Plate 1 the wigwam and the canoe are held in place with pins. Plates 5 and 6 show the construction of the wigwam, the canoe and various figures that may be needed in making up other tableaux of the famous lyric. The figures of Hiawatha and Minnehaha are drawn and colored on cardboard or stiff paper as shown in figures 6 and 8,

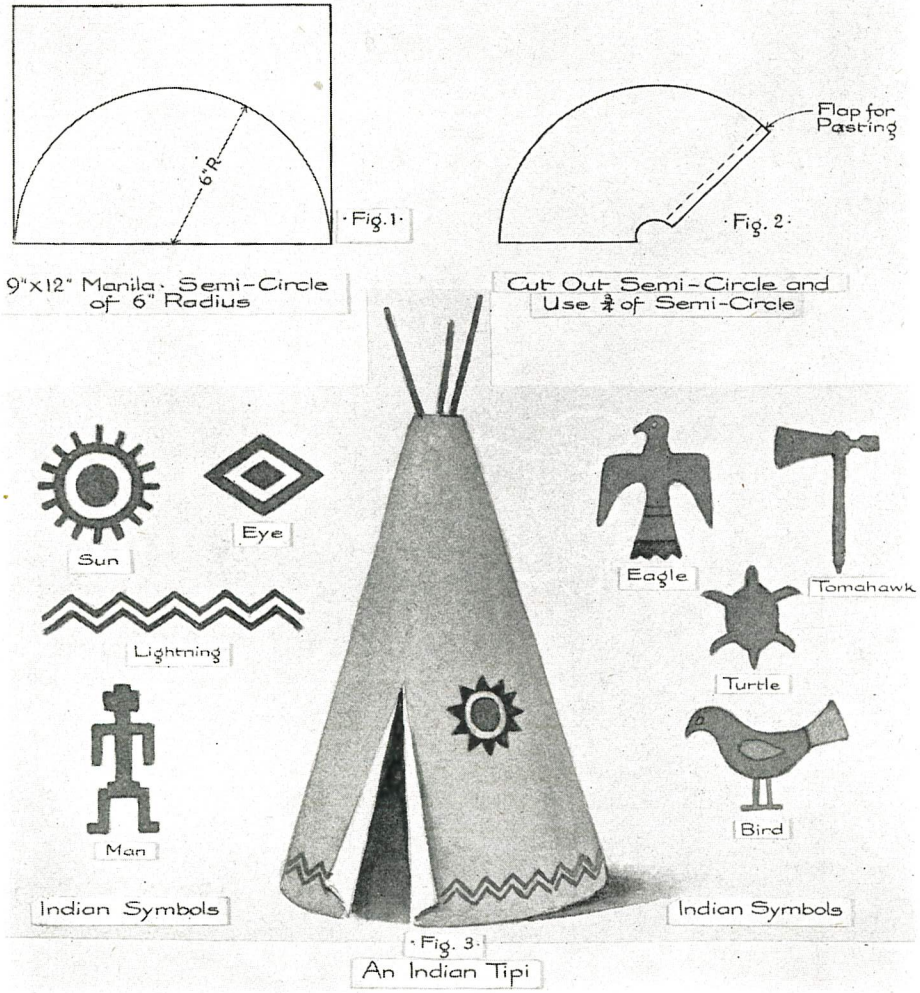


Plate V. Details of Indian Village.

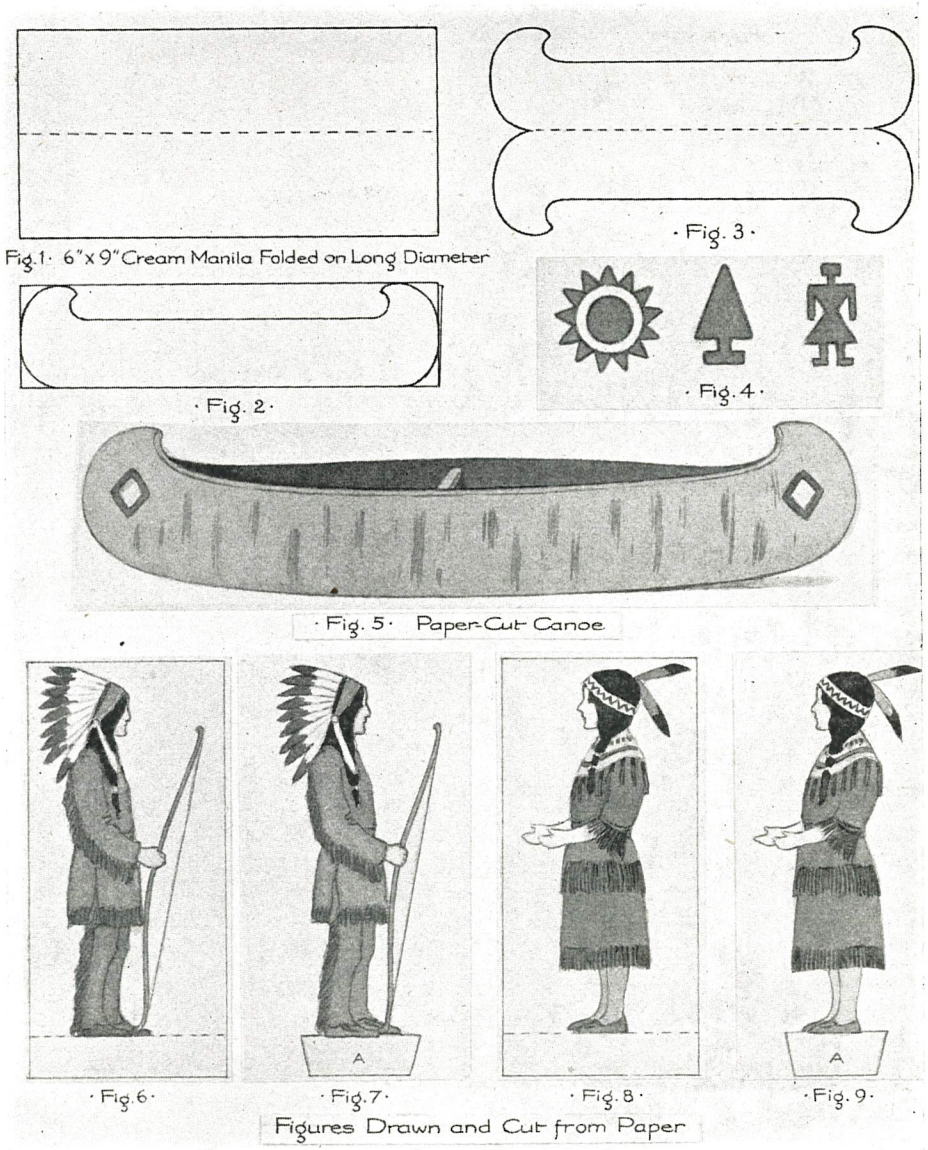


Plate VI. Figures for Indian Village.

in Plate 6, and bases are drawn as shown at A, in figures 7 and 9, Plate 6. The shapes are cut out with the bases attached, and the bases are slipped thru slits in the paper foreground, these slits falling between the strips of wood across the floor.

One bright third-grade teacher used the theater to illustrate the work she had been doing in primary geography. Four different countries were shown in the tableaux,—Japan, Holland, Arabia and the country of the Eskimos. Plates 7 and 8 show two of these very striking effects. If it were possible to reproduce in color the beauty of these arrangements, the most hardened critic of modern educational devices would be converted to the value of the quadruplex theater. The use of "hot" colors in the intense blue of the tropical sky and burning sand, contrasted with the cold grays and steel blues of the ice bound country of the north, was positively thrilling, as the theater revolved and showed one effect on the heels of another. A particularly fine tableau was shown in Plate 8. Here the white huts, the pale blue icebergs, the fur-clad figures of the Eskimos and the snowy foreground were sprinkled with a generous shower of diamond dust. This sparkled with frosty whiteness against the vivid colors of the Aurora Borealis, cut from violet and rose colored papers, pasted upon a cold gray sky! The children's joy in this scene was real and intense. Their "traveling picture-show" moved from room to room, and their entertainments were in great demand.

In the absence of a properly equipped manual training department, the theater can be built at slight expense, by any carpenter. The accompanying drawings give full details and dimensions. A coat of dark green paint should be applied to the outside of the theater, and the inside should be painted white.

NOTE—The illustrations in this article are used with the permission of The Prang Company.

Plate VII. A Tropical Scene.

Plate VIII. An Arctic Scene.

Textiles: A Course for a Homemaking School

Esther M. Downing, Lowell, Mass.

THERE is a reason for placing the subject, Textiles, in the course of study of a Homemaking School. Once it was woman, and woman only who understood the processes of cloth making, but when the manufacture was taken from the home and carried into the factory, man took his place beside the machine and woman not only ceased to spin and weave but she accepted the product of the new manufacturer without due care as to its value and quality. If man is the manufacturer, woman is the chief buyer and main consumer. Our girls are the future women. The Vocational Schools are trying to revive the interest of women in Textiles with the end in view of producing intelligent purchasers. It is those who buy who are responsible for the standards of the market. The manufacturer will meet the demand. The movement should be to educate the buyers to demand the proper standards.

Inasmuch as we understand thoroly that which we learn by the actual doing of things it is a good plan to conduct the course in Textiles by laboratory method.

Recognition of figures, a conception of numbers, must precede all processes of arithmetic hence the a, b, c's of Textiles must receive attention before there can be genuine appreciation of the finished fabric on the counter.

The first experiment might aim to teach familiar words of the textile language. A salesman will use the terms weave, warp, filling, fiber, etc. It behooves the customer to understand what the clerk is talking about and not conclude that the goods must be of first quality just because such high sounding language is being used to describe it. For this experiment it is suggested that each pupil be furnished with a 4 in. square sample of burlap (burlap, because of the coarseness of the weave and the ease with which warp and filling yarns can be withdrawn).

There should be some actual weaving on a small, hand loom by each pupil for several reasons—

1. It teaches as nothing else can the construction of cloth.
2. It impresses the meaning of textile terms.
3. Three weaves—plain, twill, and pile can be illustrated. These and other classes of weave can be identified in consequence.
4. It gives acquaintance with many materials before they come up for study as individual fabrics.
5. Weaving opens up the subject of adulteration. When the pupil has actually done some weaving it is an easy matter to see how a close weave with heavy filling will completely conceal a cheap warp of lighter weight.

Next in order is the study of the nature and characteristics of the five principal textile fibers—wool, mohair, silk, cotton, and linen. Certain facts are true of the cotton fabric because of the cotton fibers which compose it. The silk fiber gives to the silk fabric its beautiful lustre, its strength and durability, if not weighted or otherwise adulterated. The length of the linen fiber gives to the linen tablecloth a smoothness which it is impossible for the cotton cloth to have because of the short length of the cotton fiber. The quality of absorbing water readily makes the linen dish towel of greater advantage than the one of cotton which becomes saturated all too soon. The linen fabric taking the heat from the body sends it out quickly, therefore it is cool for summer wear while the warm, winter wool fabric holds the heat proving linen a good and wool a poor conductor of heat. These illustrations cite the necessity for the study of the fibers which in quantity compose the fabric.

In sequence the Processes of Manufacture would be next in order and, while we generally recognize that these processes should be understood, it is almost impossible to go into that part of the subject of textiles with the present allotment of time. There must be a study to some extent, however, of finishing processes; else, how is the buyer to understand the trade terms—mercerization, woolens and worsteds, finished and unfinished worsteds, Storm serges and French serges; how is she to know why broadcloth wears shabby by the wearing off of the nap; why serge wears shiny because the side of the fiber is exposed to constant contact?

The main work in Textiles is the study of fabrics. More important than testing is a knowledge of the fabrics on the market. This knowledge should include familiarity with trade names, easy recognition of the staple fabrics, an idea of the usual width and the range in price, noting particularly the average selling quality or qualities. Ability to recognize a fabric means an acquaintance with its distinguishing features. The following study of Chambray is typical of cotton fabric study.

1. *Weave*—Plain and fairly close.
2. *Distinguishing Feature*—Chambrays are always woven with a colored warp and *white filling* so there will always be a white selvedge. The effect will be that of a solid color, but a softened color because of the white filling.
3. *Weight*—Light.
4. *Use*—Summer dresses.
5. *Width*—32 inches.
6. *Price*—20c up; popular price—25c (sometimes found on the remnant counter for 10c).
7. *Other points to be noted*: Chambrays rank next to ginghams in cotton dress fabrics.

The pupil arrives at these conclusions by examination of her own small sample and that of several large pieces of chambray passed about thru the class; by removing several warp filling yarns—sometimes under written direction, sometimes under verbal suggestion of the teacher.

When a fabric under study bears close resemblance to other fabrics that fact should be noted and the points of resemblance and difference studied. For instance,

when working on longcloth it should be laid along-side batiste, lawn, muslin, etc. The closeness of the weave and the consequent whiter appearance distinguish longcloth from the fabrics which it resembles. Longcloth should not be passed over without note being made that there will be a saving of money by buying this fabric by the piece of twelve yards.

To make the study of fabric less monotonous it is often possible to group materials which are similar. One grouping might be the serges, diagonal, whipcord, henrietta, cashmere, gabardine, cheviot—all twilled fabrics. When making a study of muslin there could be included: dimity, dotted muslin, cross-barred muslin, mull, organdie, etc.

There is generally a reason for the use to which a fabric is put:

a. Longcloth is soft and of light weight hence its use for underwear, aprons, children's dresses.

b. Percale is durable, launders nicely, is of low cost; therefore, it is used widely for aprons, dresses, shirtwaists, and skirts.

c. Galatea is noted for its strength and durability. It stands much wear and washing—all reasons for its occasional trade-mark "Ironclad" and for its use for children's dresses and outing suits.

The width of a material is the determinant of the amount of goods to be purchased; hence, quite a point should be made of the usual width of fabrics. Pupils themselves will recognize that fact. Examination of pattern envelopes and magazine cuts will demonstrate that a certain number of yards of one width will be required to carry out the design of the pattern; that a lesser number of yards will be required of a wider width; that a larger number of yards if the material is narrow. If there could be actual use of every fabric studied there would be no difficulty in fastening the facts relative to it. The readiness with which the width and price of percale and longcloth are given testify that the pupils have used both materials in the sewing classes while the hesitancy when similar questions are asked about batiste and poplin show that experience is needed to lock the facts in the memory.

However, until that experience is forthcoming the notebook is the book of reference. At some future date a girl may wish to purchase serge for suiting. Consulting her textile note she reads that serges range in price from 50c to $3.00; that the average best selling serge is $1.00 per yard; that the cheapest all wool serge probably cannot be purchased under 50c and that it is narrow. With these facts in mind she has a little fund of information with which to meet the salesman's statements.

In studying fabrics each pupil should be provided with a small sample which she can mount in her notebook. There should be passed from pupil to pupil three qualities of the fabric under study in quarter or half yard lengths—the cheap quality, the expensive, the average best selling quality. Appearance, feel, and width are the determinants of price.

Of course there must be some testing, but the tests should be practical. The use of sulphuric acid and caustic soda is dangerous altho we have been guilty of their use in the Lowell school. Medicine dropper and glass rod were used, but it is unwise nevertheless, and surely it is not practical. No housewife has such articles as powerful acids and caustic alkalies in her cupboard or medicine closet, nor is she apt to buy such things for the purpose of testing a probable purchase. My personal experience has been that the dealers in fabrics are not so ready to deceive the public as the textbooks on textiles would have us believe. I visited every dry goods store in town searching for an imitation of dotted muslin with the intention in mind of having demonstrated the fact that, if the spots were pasted on the goods instead of being stitched into it, they would disappear by being scraped with the finger nail; that they would turn brown when a hot iron was applied to the paste. I could not find such a piece of goods. Even in the ten-cent store the very cheap lace curtaining had the spots and figures stitched into the fabric.

I was just as unsuccessful in a search for an imitation of a mercerized fabric. Sometimes a piece of goods is calendered to give it a silky appearance, which will disappear when the fabric is washed, while the mercerized fabric retains its silkiness after laundering. I have been unable to find the imitation.

The burning test is safe and practically satisfactory. It can be followed out in this fashion:

1. Burn wool fibers in a small pan (a tin cover will answer the purpose and an alcohol lamp and taper will supply the necessary light). Notice three things: There will be a *slow* burning without flame; an odor of burnt hair; at the end of each fiber there will be a charred bead.

2. Burn a tuft of cotton fibers. Notice the quick burning with flame; the absence of the burnt animal odor; the absence of the bead on the burned fiber tips.

3. Repeat with silk and linen.

4. Now that the action of burning animal and vegetable fibers has been noted individual warp and filling yarns can be withdrawn from the fabrics under test and observations made as to whether these fabrics are all wool, cotton and wool, all silk, cotton and silk, etc.

Olive oil, glycerine anyway, is found in nearly every home. A simple test to prove whether a fabric is cotton or linen is to put a drop of oil or glycerine on the cloth and press between blotters. Linen will be translucent, cotton opaque.

Such tests are easy, safe and practical.

The miscroscope is not an object of everyday household use, yet a course in textiles would in no way be complete were a pupil not made familiar with the appearance of the fibers under the microscope. The very surest test is the microscopic test. By means of pictures and the microscope itself pupils learn the characteristic appearance of the principal fibers. Cotton being the cheapest fiber is the chief adulterant used. If there is suspicion that mercerized cotton has been used with silk in a fabric, the microscope will reveal the occasional twist in the cotton, when there is any cotton present. Microscopical examination will show the mixture of shoddy with pure wool. If cotton has

been mixed with linen, the twisted cotton fiber is easily distinguishable from the long, straight flax fiber.

"Forewarned is forearmed." Every purchaser of fabrics should have a knowledge of the possibilities in the way of adulteration. A few illustrations will expand the meaning of that statement.

Sometimes inferior cottons and linens are made to look of better grade by the presence of an overamount of sizing or starch. A certain amount is legitimate to protect the fabric from becoming mussed by the handling it will receive on the counter. Too much sizing can be detected by holding the fabric to the light when the starch can be seen between the threads. Sometimes the starch can be scraped away by the fingernail. The surest way would be to boil a sample. The appearance of the sample after washing will show what effect washing will have on the fabric.

There is the subject of mixing cotton with wool, a good thing sometimes in underwear; not at all a good thing in dress goods. The latter can be proven by damping a piece of mixed cotton and wool goods then pressing it. The cockled appearance will demonstrate that cotton and wool, shrinking differently, can never look well pressed.

Shoddy should be noted with a good deal to be said in its favor. One who knows whereof he speaks remarked recently, "Shoddy is the most abused word in the English language except 'thank you.'"

In attacking the adulteration of silk by loading, something should be said in defence. To the argument that the silk of today cannot be passed down from grandmother to granddaughter as of yore the manufacturer might well reply that social opportunities, the occasions for the silk dress, have multiplied exceedingly. The more common use of silk demands a lower price than that our grandmothers paid. It takes 3,000 silkworms to spin one pound of silk. It takes from one to two pounds of silk for a dress. What can the manufacturer do to meet that expense and the demand for low price too? He will use less silk and make up weight by taking advantage of the ease with which silk takes up water. In water he will dissolve dye or metallic salts, and the silk will absorb the solution readily. This is called loading and, if carried to a great extent, is objectionable because it injures the wearing qualities, and the silk will crack.

Conditions of the day or in the market very often suggest topics for study. There is Miss Genevieve Clark's slogan for the people of the United States: "Use more cotton." It opens up the subject of our oversupply of cotton due to the war in Europe.

Again, in the ready-to-wear departments during the last year, skirts have been showing of a new material, Tussah—a combination of mohair with worsted. The wool counter shows several new fabrics combining the two fibers in different weaves. A study of mohair fabrics should note their adaptability for business wear because in the language of the clerk who showed the fabric to me, "They are unwrinkable, unshrinkable, and dust repellent."

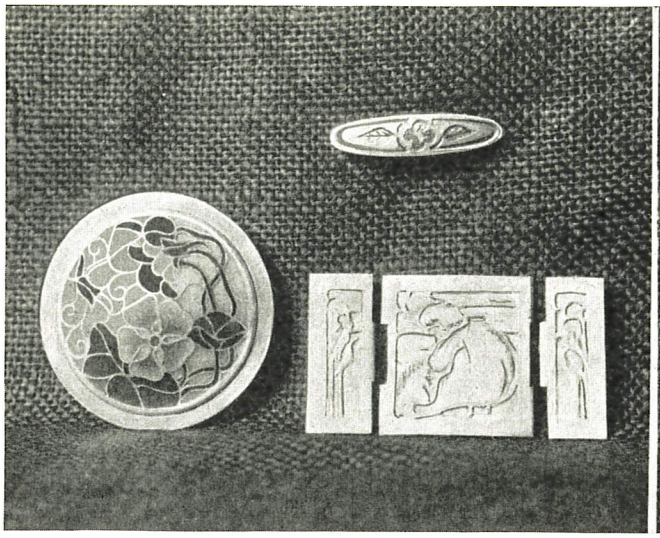
A girl should become acquainted in her textile class with the terms she is apt to meet in the trade world. In the purchase of a rub-dry towel she will probably hear of Sea-Island-cotton; at the towel counter she will meet Damask and Huckaback; in the carpet department the clerk will show ingrain, tapestry, Axminister, and Wilton rugs; at the stocking counter she will find silk-lisle and lisle thread hosiery. There are countless terms used in every department of dry goods and clothing.

If possible there should be a little time for dyeing that the girls may learn how to make an old dress look like new.

This course in Textiles by topical analysis would read:

I. Reason for the Study of Textile.
II. Construction of Cloth.
III. Weaves.
IV. Fibers.
V. Finishing Processes.
Uses.
Distinguishing Features.
VI. Fabrics. Width.
Price.
VII. Adulterations.
VIII. Testing.
IX. Textile Terms in Trade World.
X. Present Day Textile Problems.
XI. Dyeing.

No honor surpasses that of being a teacher of right things and right thinking.—*Fannie Fern Andrews.*



Basse Taille Enamel. (Pieces at right ready for enamel.)

Cloisonné and Plique à Jour Enamel.

ART ENAMELING

Louis J. Haas, Lansdown, Md.

MUCH interest is being shown today in the crafts, and much has been written on the subject of Art Metal Work and Jewelry in the interest of the crafts student. Little attention has been given to the Art of Enameling. In the works of the medieval craftsman enameling as an art played a prominent part just as it should and must today if work of variety and beauty is to be accomplished.

The term enamel, as used by the medieval craftsman, and by the Art Metal Work and Jewelry Craftsman today, implies the art of fusing colored glass to the surface of metals, so as to enhance their ornamental or decorative value. Enameling has been practiced by many races and dates back almost to the time of the early Egyptian craftsman. Altho, the Eyptians knew much of the art of coloring glass and its decorative use, their socalled enamels were only inlays of glass or minute mosaics, in that the colored glass was cemented and not fused to the metal.

In the development of the art of enameling in many countries and thru many centuries, many styles or different types of enamel came into being. The museums show examples of Champlevé, Cloisonné, Repoussé, Basse Taille, Wire, "Plique à Jour," Incrusted, and Painted Enamel. It is not intended to discuss these different styles further than to say that each is different from the other decoratively and requires different treatment in executing. Champlevé, the simplest in treatment and character, is believed to be the most primitive of all. It has, for this reason, been selected as the style whose method of execution could be best explained to those knowing little of the craft of enameling.

There are two kinds of enamel, Transparent and Opaque. The treatment of both is the same. The results differ as suggested by the two names. Enamel is made in the form of thin round cakes of glass, like Figure 1, and can be had in any color also colorless as flux or fondant. It is sold by the ounce and can be bought in any quantity desired. Enamels can be bought ground, but enamelers agree that ground enamel deteriorates, therefore, it is better to buy in the cake, and grind it as needed. A limited pallet is advisable; for example a good one is, opal, yellow, light red, rich red, lilac, lavender, light blue, turquoise, rich blue, light green, rich green, and flux. More flux should be ordered than color because it is used frequently to lighten the colors as well as for a foundation enamel.

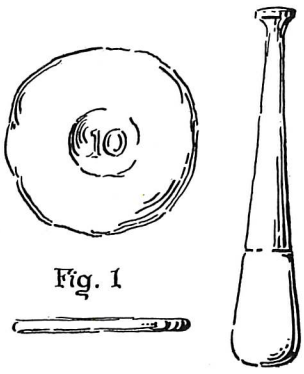


Fig. 1

Fig. 2.

The enamel is ground in a mortar with a pestle similar to Figure 2. The best mortars are those made of agate, but they are very expensive. A four-inch wedgewood mortar with pestle is quite inexpensive and will do very well. First, half fill the mortar with clean water, and place in it a piece of enamel about three quarters of an inch square, which has been broken from the cake with a sharp blow of a hammer. Place the pestle on the enamel as shown in Figure 3, and taking a light mallet strike a number of blows upon the handle of the pestle until the contents of the mortar are crushed to the size of very fine gravel. Now grasp the pestle in the right hand and steady the mortar with the left, as

shown in Figure 4; with the head of pestle resting in the center of the mortar, give the handle a quick, circular rocking motion. This will soon reduce the enamel to the texture of fine sand. Now and then stop the grinding to examine with the finger. When fine enough the enamel is ready for washing. Allow the contents of the mortar to settle a few moments; then, when the enamel has all gone to the bottom, carefully pour off the water as shown in Figure 5. Add fresh water; allow to settle, and pour off the water as before. Three washings are sufficient to clean the enamel, but it should be given at least this number. Now place the enamel in a bottle with enough clear water to well cover the enamel. Bottles like those shown in Figure 6, about two and one-half inches tall, with one inch mouth, are best suited for this use. Both the cork and the bottle should be labeled with the number and name of the color it contains. Mortars and bottles can be procured from drug or laboratory supply houses.

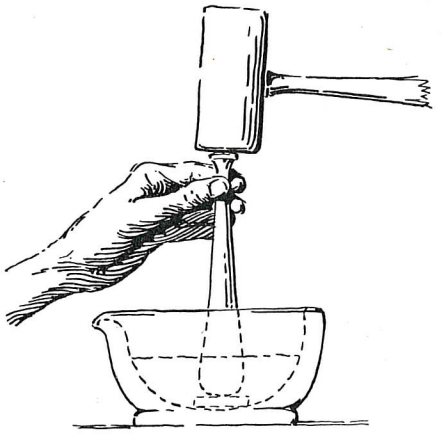


Fig. 3.

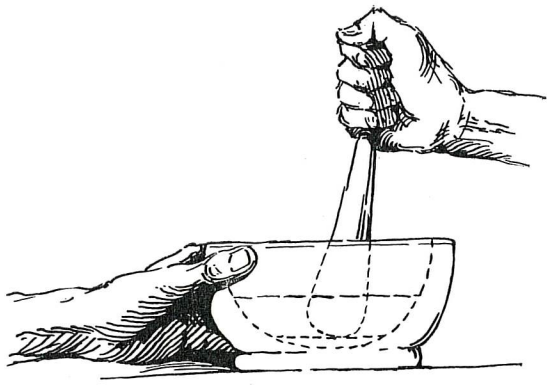


Fig 4.

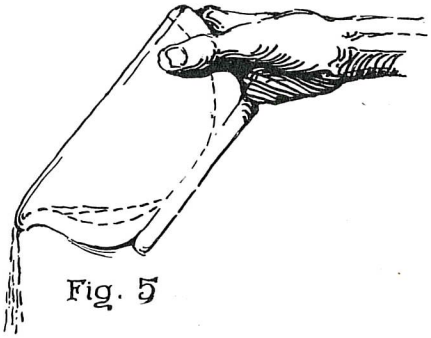


Fig. 5

Having the enamel ready to use, thought may be given to the piece of work to be enameled. For the first piece a belt buckle would be good, and as silver melts down much quicker than copper, we shall use copper to construct it. Select some pleasingly simple and conventional contour as the shape of the buckle and place therein your design. Keep in mind that the one main characteristic of Champlevé Enamel is simplicity of form. Whatever you use as a motive must be conventionalized so that the design is composed of a number of simple spots, beautiful in contour and arrangement, each separated from the other by a certain amount of metal. Thought must be given to the balance of metal against color or enamel. It is the tone of the metal, if proportionately in good relation to the design, which running thru the pattern, harmonizes and lends beauty to the whole decorative scheme. Figure 7 suggests several designs which are suitable for Champlevé Enamel and explain the above named characteristics with which the design must comply if it is practical.

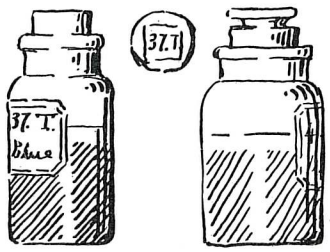


Fig. 6.

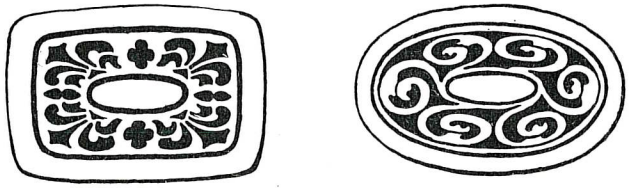


Fig. 7.

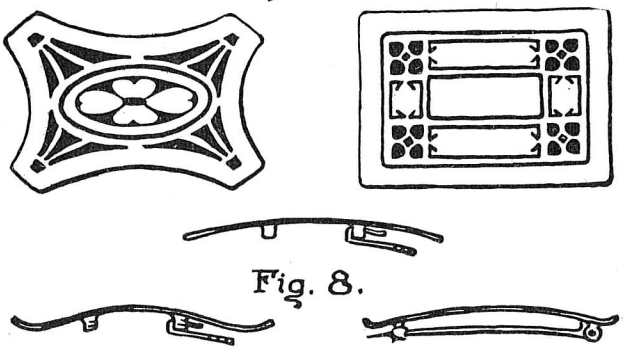


Fig. 8.

Having selected a suitable design take a piece of 18 gauge copper and trace on it the design first in pencil and then with a sharp needle or steel tracing point. Trim the metal to the exact contour of the buckle with shears or saw, and dome to some pleasing section as suggested in Figure 8, rolling back the edges if this lends beauty and character to the surface. This

raising of the surface and rolling back of the edges not only lends beauty to the design, but reinforces the buckle and helps the metal to stand the strain caused by a difference of shrinkage between metal and enamel, thus greatly lessening the danger of having the enamel chip while cooling. Now proceed to cut the beds for the enamel. Take a block of wood about three inches long

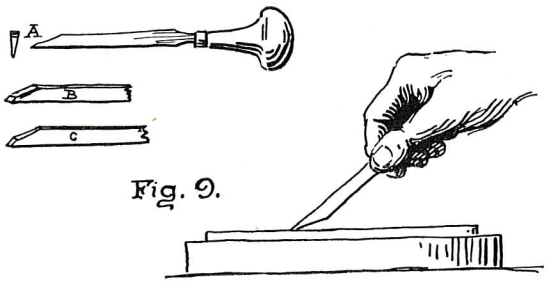


Fig. 9.

and a little larger than the metal; melt some jeweler's cement on to one end and allow it to cool. Now warm both cement and metal just enough so that when they are pressed together the metal will firmly adhere to the cement block.

Figure 9 shows the three gravers needed to do the work in hand, and also the method of sharpening them. The graver is held at an angle of about forty-five degrees, to the oil stone, with its face up and moved backward and forward a few times until sharp. The old

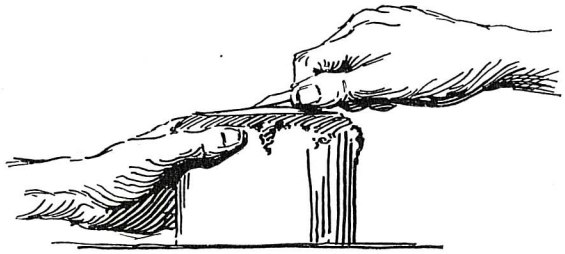


Fig. 10.

engraver tests his tool on his thumb nail. If sharp, when placed lightly against the nail, it seems to catch. Take graver A, Figure 9, and start to cut the outlines in this manner. Hold the block in your left hand. Take the narrow round-faced graver in your right hand. The graver should be held with the round face down, the ball of the handle resting in the palm of the hand near the little finger, with the thumb placed to one side of the graver and resting on the work. Move the tool forward without moving the whole hand or taking the thumb off the work, where it acts as a guide to the graver and a brake to protect the work from injury if the graver should slip. Thus cut the outlines of the spots as shown in Figure 10. Cut over the outlines two or three times to get sufficient depth to the beds to hold the enamel. The depth required is about one-third the thickness of 18 gauge metal. Now take one of the flat faced gravers, and holding it in the same manner as the first tool, cut away the inclosed surface of the beds to the required depth. When the beds for all the spots of the design have been cut, remove the metal from the block by heating it, and while the metal is still warm wipe off the cement with a piece of cotton waste or old piece of cloth. Any remaining cement may be removed by placing the buckle in alcohol for a few moments until the cement has dissolved.

Finish the construction of the buckle by soldering on the straps or joint and catch, if the buckle is to have a pin. To do this scrape all parts to be jointed clean; wire parts in place with iron binding wire; flux the joints with borax; place a small piece of solder at the joint; and then, applying slowly at first, heat the whole buckle till the solder flows. An enameler's hard silver solder must be used.

Remove the binding wire and place, while still warm, in a pickle composed of ten parts of water to which has been added one part of sulphuric acid. When scale and flux have been dissolved, remove from the pickle and rinse in water. The pickle will not hurt the hand

Fig. 11.

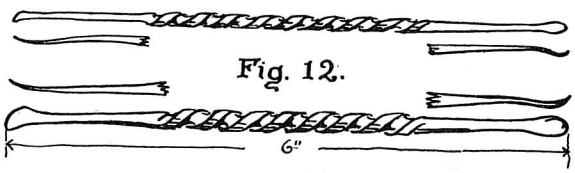


Fig. 12.

if washed off, but care should be taken not to splash it on the clothes.

The piece is cleaned for enameling by dipping, when made of copper, into a pickle composed of five parts of water to which has been added five parts of nitric acid. Take care not to let this pickle touch the hands. Dip the piece fastened to a heavy German silver or copper wire; remove after a few seconds and rinse in running water or several waters.

Take care now that nothing, not even the fingers, are allowed to touch the part of the buckle that is to be enameled. If the piece is constructed of silver it should be cleaned for enameling by boiling it in the above described sulphuric acid pickle, contained in a copper pan. Rinse it in running water, then scour with clean, fine pumice and water with a clean, new bristle brush.

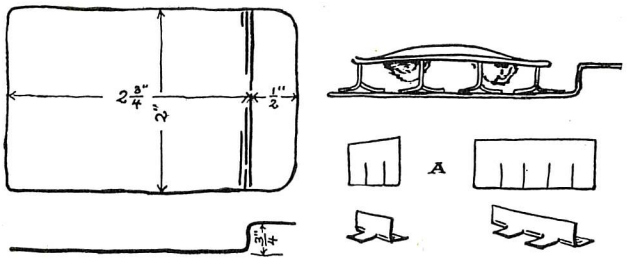


Fig. 13.

Rinse thoroly in running water to remove all of the pumice, and allow to drain taking care not to touch the face of the buckle. Perfect cleanliness alone in all the stages of enameling, is rewarded with perfect success.

Now take yellow ochre and make a thick paste of it by adding water. Bank heavily all soldered joints with this paste, as shown in Figure 11, taking every care to

keep from soiling the face of the work. It is now ready to receive the enamel.

Place a quantity of each color to be used on a piece of glass, or saucer, and fill in the prepared beds with the aid of a camel's hair brush, or one of the small spoon ended tools or spatulas, shown in Figure 12, which can be made either of copper or German silver wire. Take care not to get colors outside of their respective places, and always wash the brush or spatula in clean water before transferring from one color to another, if purity of hue is desired. The beds should be filled so that the enamel is of an even depth and stands just a slight bit higher than the surface of the metal. When all the colors are in place take a clean piece of old linen and absorb moisture carefully from the enamel by touching the linen to the edge of the spots. Now take the linen and carefully and evenly press the enamel firmly into its place. This insures a much more even glaze and a surface less liable to show little blow holes. The piece is now ready to place on its support for firing.

If the convenience of a muffle furnace is at hand, take a shovel made of twenty or twenty-two gauge black iron after the pattern in Figure 13, and place the piece upon it, supporting the edges at different points with small wedges of black iron, as suggested in Figure 13A. Now place it near or on top of the heated furnace and leave it there until all moisture has evaporated. The enamels will look quite white or frosty-like in color when this has been accomplished. If placed in the furnace before evaporation is complete the powdered enamel would fly off with the escaping steam, and the whole piece would have to be recharged with color.

When the piece is ready, remove both doors of the furnace with the tongs, then take the shovel and slowly place in the heated muffle taking care not to jar the work. Replace the doors but hold the upper door slightly ajar so that the changes which are taking place on the surface of the enamel may be closely watched. As the piece heats first, the enamel turns white in tone. Then as the heat increases, it becomes warm in color and seems to lump up slightly. Next the surface appears smoother and turns dark. The glaze follows immediately, the dark color seeming to fade slightly. As soon as the dark tone appears on the surface of the enamel remove the doors carefully; take hold of the shovel and, by the time the work can be removed from the muffle, the glaze will have been completed.

Place the shovel and piece upon some hot bricks or on top of the furnace and allow to cool as slowly as possible being sure the piece is not in a draught. Sometimes it takes two or three hours for a piece to become cold. This careful cooling anneals the enamel and makes it less brittle and liable to chip. Never handle the piece after removing it from the furnace until you are sure it is cold by first having touched the shovel on which it rests. There is little danger of firing a piece of work too high in temperature if the piece is made of copper. But, if the piece is of sterling silver, it is best to take a small square of the silver, place a little enamel on it, and fire the enamel so as to accustom the eye to the changes which precede the glaze. Never allow a piece of work made of silver to remain in the furnace a moment after you see an oily effect appear on the surface of the metal. This is the sign that the silver is ready to melt, and it cannot be removed from the furnace too quickly.

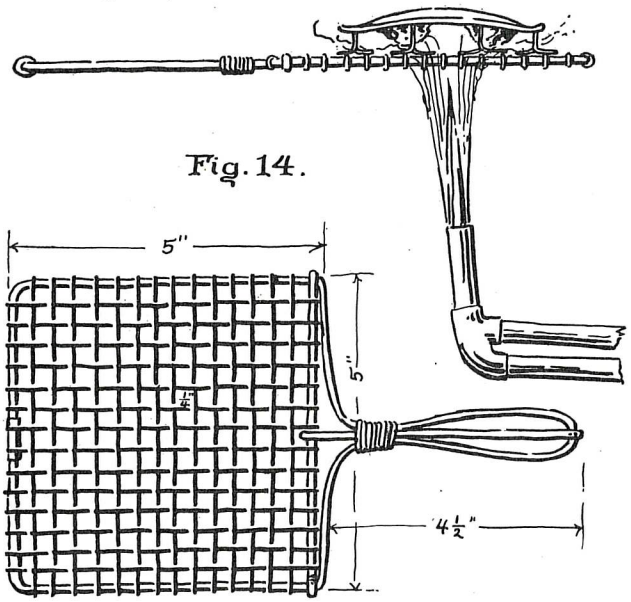
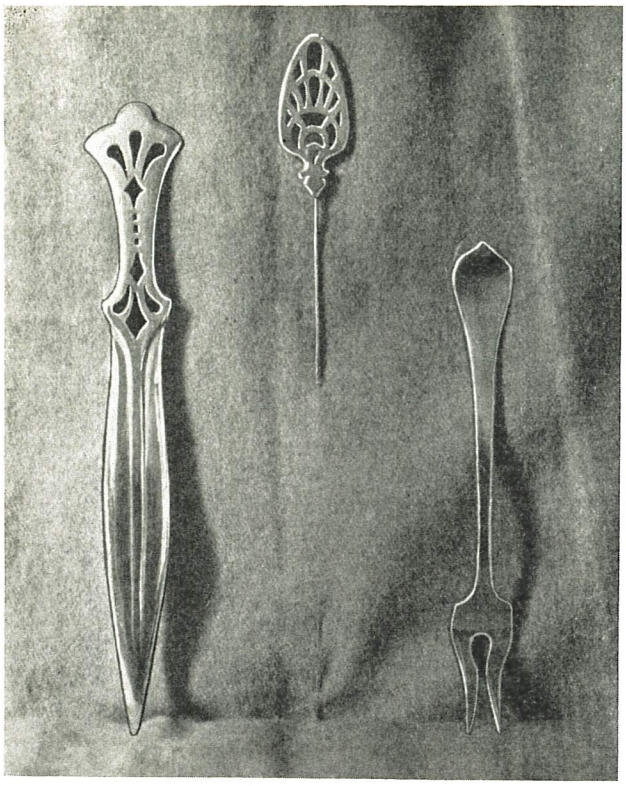


Fig. 14.

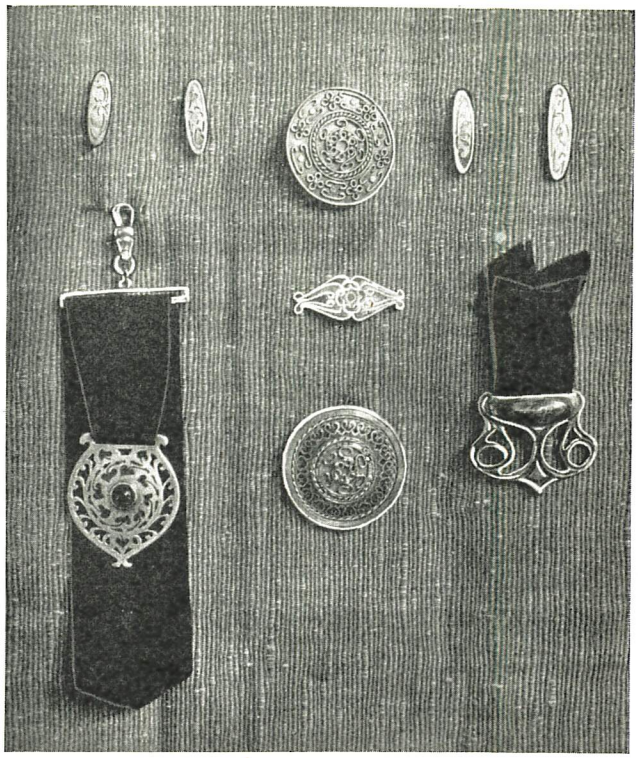
When the use of a furnace is not obtainable, a good blow pipe and foot bellows or even a large bunsen burner may be used with quite as satisfactory results provided the following directions are observed. The piece is prepared and charged with enamel as described above. It is then placed on a wire frame or support like the one shown in Figure 14, adjusting the iron wedges at different points as described before. This supporting frame should be made of black iron wire, number ten gauge being used for the frame, and number eighteen gauge for the mesh, which should be one quarter inch or less. See that no solder is used in its construction. These frames can be fashioned by hand or any regular wire worker will furnish very good ones if he is properly instructed.

Now evaporate all moisture slowly by holding the frame over the low perpendicular flame of the glow pipe or bunsen burner. Hold the frame at a sufficient distance so that it will warm slowly, and take it away from the flame now and then so that evaporation will not be hurried. When all trace of moisture is gone, place a strong flame under the piece, keeping the flame always perpendicular, and moving either it or the frame so as to gradually heat the whole piece evenly. Use the brush end of the flame and not the very hot blue center as this would possibly burn some of the small parts on the back of the buckle. Watch for the same changes described in the instructions on the use of the muffle furnace, and when a perfect glaze is evenly obtained take away the flame and place on hot bricks to cool. The same care must be taken to cool the piece slowly as above described; and if the piece be of silver, care must be taken not to over fire it.

When the piece is cold, place it in the above mentioned sulphuric acid pickle until clean, then rinse in water. If the design is of such a simple, bold type that



Plique à Jour Enamel.



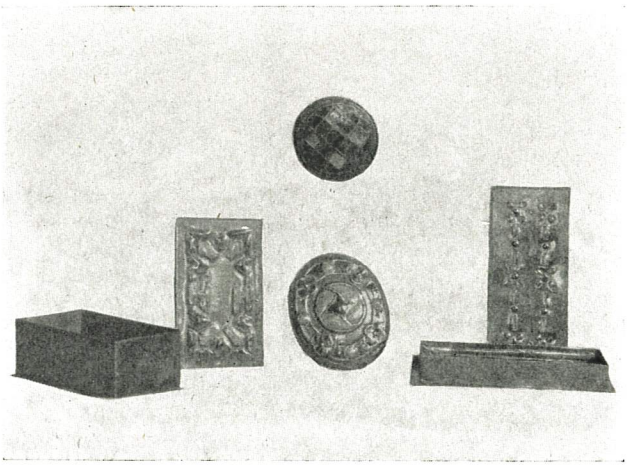
Examples of Champlevé, Cloisonné and Plique à Jour Enamel.

the results are satisfactory, the piece may now be polished first with tripoli and then with rouge, and cleaned with soap and water.

Should the design demand sharpness of outline and perfection of surface for the enamel, take a small flat carborundum stone or fine file, and dipping both it and the piece of work in water, grind the entire surface of the buckle until even and satisfactory. Wash frequently while grinding and, when an unbroken surface is obtained, rinse thoroly in running water. Now clean in the pickle, used before in cleaning piece for enamel and, if any small holes appear in the surface, carefully fill these with a small quantity of enamel of the proper color. Bank carefully the soldered joints with ochre as before, place on the support, evaporate the moisture, and very slowly apply the heat until an even glaze is obtained. Follow all the instructions given for the first firing. When the piece has cooled, pickle and rinse as described above.

If the surface and color are now perfect, the piece may be polished, cleaned and left bright if this finish harmonizes with the rest of the color scheme. Should the brightly polished surface of the metal seem not to go well with the enamel, it may be toned down by oxidizing.

Make a solution of water in which has been dissolved a small piece of liver of sulphur. In this dip the buckle and when the desired tone is reached, rinse in water. Should it appear too dark, it can be lightened by rubbing with a cloth.



Repoussé Enamel Boxes and Pins.

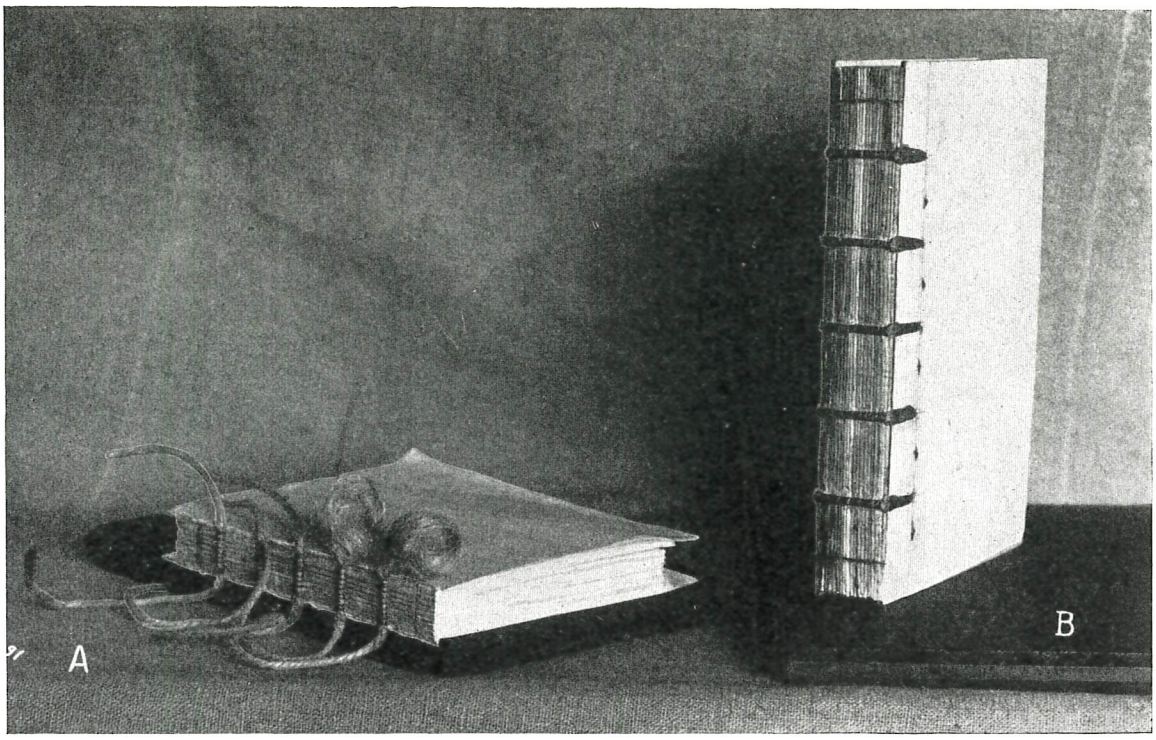


Fig. 6. A—Book sewn and backed two cords fringed for lacing on boards; the other cords just as taken out of frame.
B—Book with boards laced on.

THE HANDICRAFT OF BOOK-BINDING

Ellen Gates Starr, Chicago

(Article II)

THE task of describing and illustrating any delicate and complicated manual process in popular articles has several distinct difficulties. The audience is necessarily mixed. If anything is assumed as known, those who do not know it are at a disadvantage. If nothing is assumed, the articles expand into a full manual of the process. Also, as in practice, the acquirement of one process overlaps another, so, in treating of processes, it is very difficult to divide them sharply. One photograph or cut frequently illustrates more than a single process, and is necessarily referred to more than once. No subject or process in book-binding is ever really finished in the sense of being put out of the way. Every ill-done process rises up to accuse and harass all thru the work.

For this reason I always direct my pupils to go straight thru all the necessary processes of "forwarding" (the constructive processes) on at least one book—better two, or even three—in order to enable them to understand the consequences of each ill-done process to all the following ones. After that, it is well to take a group of three or four books and put them all thru each consecutive process, with the purpose of fixing the more intricate ones in the memory, and of better acquiring the muscular habits so necessary in learning any craft.

The "moves," so to say, can be learned; i. e., they can be gone thru with, in a short time, but each step offers indefinite combinations of possibility of error. I have never had a pupil so unresourceful as not to invent an entirely original mistake! "How interesting! That has never been done before" is a compliment paid to each in turn, and I once wrote in a pupil's early book, "An excellent all-around example of how not to do it."

For acquiring these accurate and dependable muscular habits and experience in dealing with materials necessary for reasonably good work, a full year is the minimum time. I spent fifteen months with Mr. Cobden-Sanderson at the Doves Bindery in London, and found it none too much. My hours were nine to four with an hour at noon, a Saturday half-holiday and only two weeks of holidays in the year. At the end of a year I came home to avoid a second London winter of fog and artificial light, returning to London for three additional months' work in the following spring. During the three months' work at home I discovered a great deal which I did not know.

To resume the description of processes: After the book is sewn and backed, assuming that it is not to be cut in the press, but has been gilded before "rough" sewing—as I prefer and have described in the first article—it is now almost ready to be laced into its board covers. All that remains is to fray out the ends of the cords. Figure 6 A shows two of the cords frayed out. The board covers must now be prepared. They are of imported English "millboard." So far as I know, no millboard sufficiently firm and compact for thoro and durable work is made in the United States. The boards are roughly cut to the approximate size. (We do it with a huge pair of shears of which one handle is made fast. I have never seen a pair except my own in this

country.) They are then lined with cheap white paper, ordinarily with one sheet on the outside and two on the insides of the boards. The lining draws the boards slightly; and the object of using two thicknesses on the inner surface next the book and one on the outer, is to counteract any tendency of the cover to be concave, which is very ugly. A slight convexity is much preferable. The leather on the outside draws a little in the opposite direction, but there are still two other counteracting inner layers, the "filling-in" papers and the pasted down end papers to be duly spoken of later.

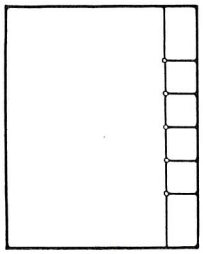


Figure 7.

After the boards are lined, they are cut, together, in the cutting press. It is well to stick the two boards together with a little paste in the center, so that they will not slip at all. The cutting press is the same as the backing press, reversed. It was shown in Fig. 5 B in the first article in the March number of this Magazine. An implement called a "plow," which runs horizontally, held in place by a groove, holds the knife, and by means of a screw, presses it further and further into the boards, as it moves back and forth. After cutting one edge—the one

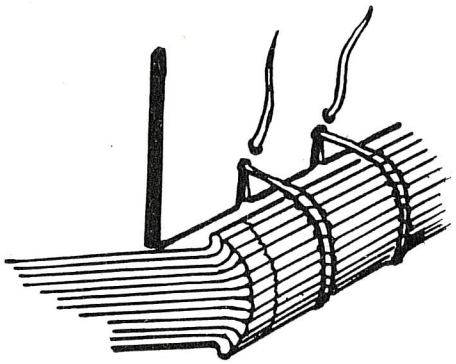


Figure 8.

which is to fit into the hinge—the top and bottom edges are squared to the back at a length which leaves a projection beyond the edges of the sheets sufficient to protect them. These projections are called the "squares." Their width is a matter of taste, but in a large book they require to be wider than in a small one. The fore-edge squares are then measured by laying the cover down on the book, the back fitting into the hinge and squared by the top.

After the boards are cut, a line is drawn about one-half, or in a large book, three-quarters of an inch from the back of the cover. The board is then laid upon the book and lines drawn at right angles to it, from the cords to this line (see Fig. 7). A row of holes is then driven thru the board from the outside, with a hammer and large punch or bodkin, on a piece of lead. Reversing the board, another row is driven thru, between the first,

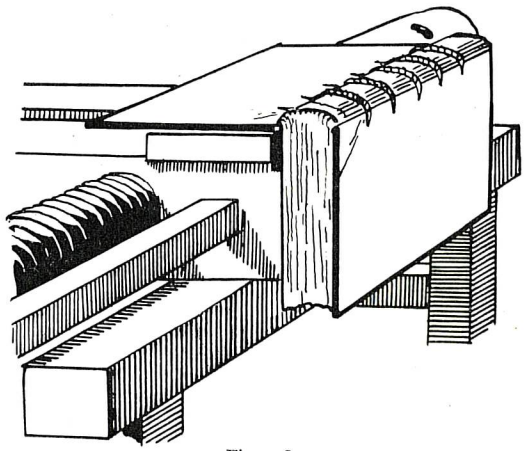


Figure 9.

in the opposite direction. The frayed cords, after removing the glue and filling them with paste, are laced thru these holes as shown in Fig. 8, the protruding ends cut off, the book laid on a flat piece of iron (Fig. 9) and hammered down. To flatten them still more a tin plate is put inside and outside of each cover, fitted close to the hinge, and the book is then put into the heavy standing press between boards, and left usually over night. It is always well to have several books on hand in various stages, as at intervals a book must remain for some time in press. The frequent change from one process to another also prevents both muscles and attention from becoming over fatigued.

After the laced in cords are pressed down quite flat so as not to show unpleasantly thru the leather, the book is again taken out of press, the back moistened a little with paste and the glue on the outside of the back removed, usually with a bone folder. Only the glue which has sunk in between the sections is of any value in holding them together. At the stage when the back and bands are slightly moist it is a good plan to straighten the bands and, if the arch is not perfect, it can sometimes be made to take a better form at this point by pushing it into shape and leaving it to dry in the backing press. The bands are straightened by band nippers (Fig. 10) and they may also have their positions slightly altered if the spaces are uneven, by driving them gently

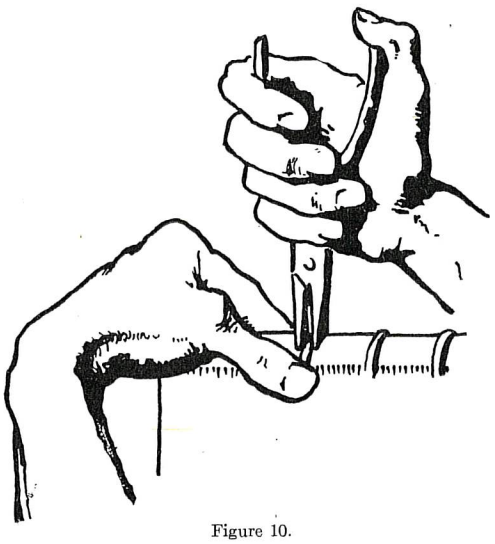


Figure 10.

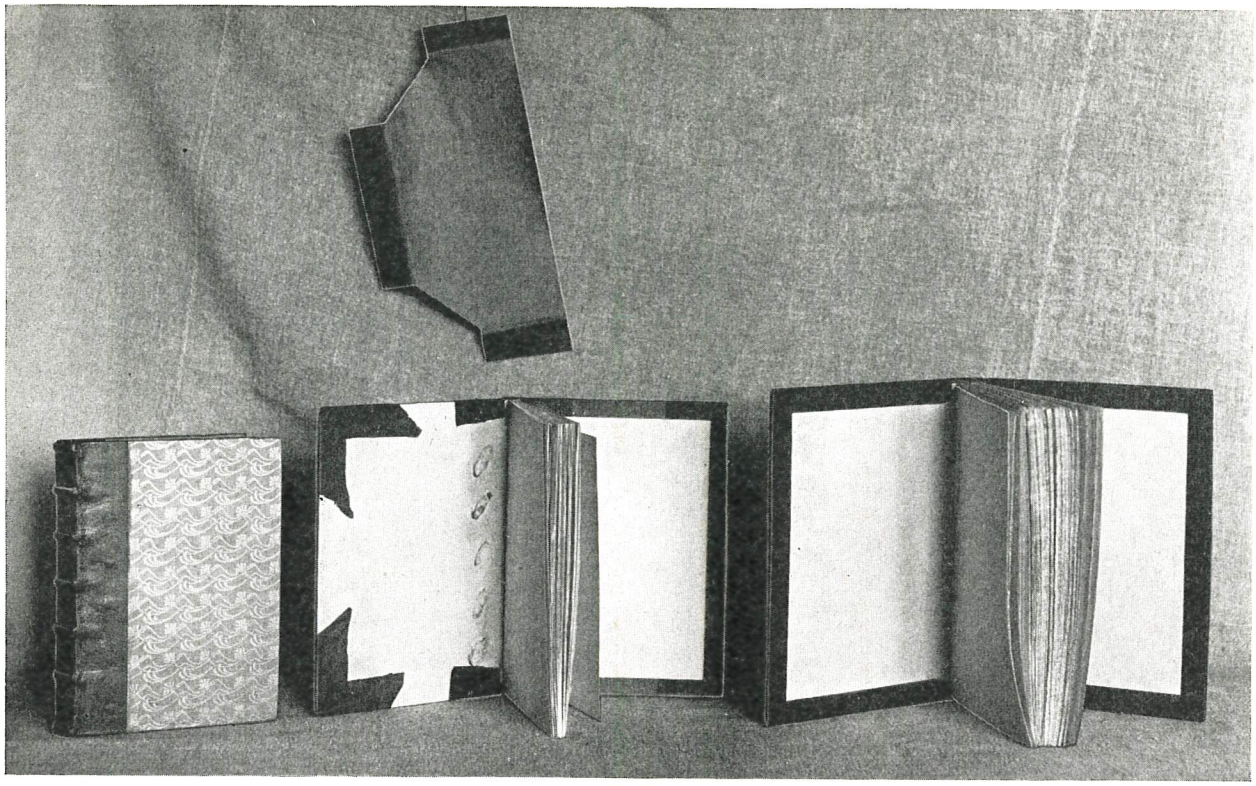


Figure 11. Left) Half-bound book finished—pupil's first book. (Middle) Half-bound book—covers open; one side trimmed and filled; the other side left rough. (Above) Paper cut for one side. (Right) Full book bound—inside view—trimmed and filled; under papers not pasted down.

to one side or the other with a hammer and a band stick. The band stick is used later in covering.

The book is now ready to be "head-banded." The head band is intended entirely for ornament. It is of silk wound over a strip of vellum, a bit of sewing cord or a piece of gut. Sometimes the two latter, one larger than the other, make a double head band which is very ornamental. As the making of the head band is a difficult and intricate process to describe, and not a structural one, I shall omit it. In commercial books, head bands are not wrought, but bought by the yard and pasted in —a very "cheap and nasty" expedient and, to a trained eye, not in the least ornamental.

The book is now ready for covering. In the early stages, books are "half-bound" both for economy and because the process is much simpler and easier. A half binding is a book covered with a strip of leather at the back and, if to the taste of the binder, triangular pieces at the corners; the rest of the cover being of paper or cloth (see Fig. 11). The first thing to be done in preparation is the cutting and paring of the leather. A rectangular strip of leather is cut about an inch and a half longer than the book, allowing three-quarters of

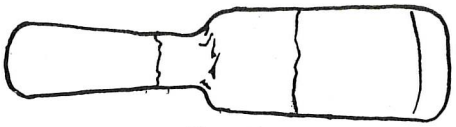


Figure 12.

an inch to turn in at each end. In the beginning it is well to allow a little more than this, in case of accident to the leather in paring; tho the pupil should practice for a time on worthless scraps before beginning on the piece he is really intending to use. The width of the piece varies with the taste of the binder, and the thick-

Figure 13. Paring a Strip of Leather. Note position of the hands.

ness of the book. It may come over on the side of the book one-fourth of the distance more or less. I dislike to see a "half" binding really taking up half the cover space. One feels like asking why, since it came so far toward covering the space, a little more might not have been expended and the whole actually covered. I find more than one-third a very ugly proportion, and corners of leather are not to my taste altho they do serve the purpose of protection.

The knife which we of the school of Cobden-Sanderson use in paring leather is of the shape shown in Fig. 12. The stone should not be so hard as to dull the edge of the knife too fast. A spoiled lithographer's stone is used and should be chosen for the greatest surface and

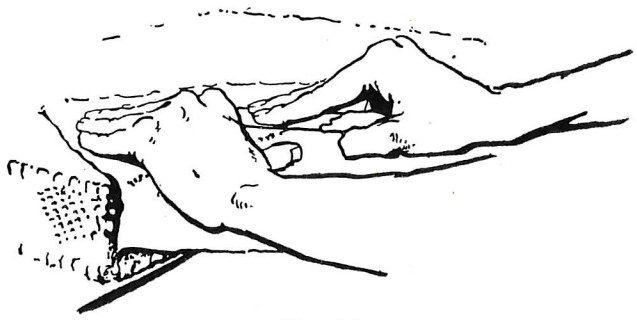


Figure 14.

the least weight, relatively, for convenience in lifting it about. The bench should be firm. Men usually stand but it is quite possible to sit on a high stool, as shown in Fig. 13, and pare well. This cut shows a long ribbon being pared off the edge of a piece of leather in a bevel. This is the first step in paring a full skin, or a strip for half binding. The knife should be held at such an angle with the stone as to cut the ribbon off as cleanly to the edge as possible. Naturally, the pupil does not succeed in doing this at the first or second effort. In fact, early efforts of paring usually resemble the work of the average rat. So let not the aspiring, unassisted amateur be unduly depressed by such a result. After the first beveled strip is removed, the angle of the knife to the stone may be lessened and a second and wider strip removed. After that the position is that shown in Fig. 14, the knife being held very flat. In paring the strip for half binding, the whole piece is thinned evenly; then at the top and bottom where the leather is turned in, for about three-quarters of an inch, it is pared so much more as to make the two folds together not noticeably thicker than the rest of the piece, else there will be unsightly lumps in the top and bottom panels. The very edge of the leather must be "feathered" so that it will leave no edge to be seen or felt.

In cutting a skin for full binding it is well first to cut a pattern of paper from the book in boards, laying the opened boards down on the paper and drawing lines at least three-quarters of an inch from the edge. The skin is then pared around the edge just as in the process described for the top and bottom of the strip for half binding, except that it should be made a little less thin in the rest of the margin than in the part turned in over the back. The slope should be very even and gradual and the rule is, as in most cases, "enough and not too much." If pared too much the skin is not durable; if too little the edges are clumsy. If uneven there are bumps and hollows all along the edge. It is all a matter of practice and experience after good teaching.

In Fig. 15 is a pared skin. The dye comes thru on the wrong side somewhat unevenly, so that it does not show the paring as even as it should. But you will see that a strip is pared down the back, leaving the central part of each cover surface untouched. This central strip should be done last after the edges are finished, and should be carefully marked off with pencil by laying the open covers on the book.

The book is now ready to be covered. This is the most constructive process of all, which makes the book really a book.

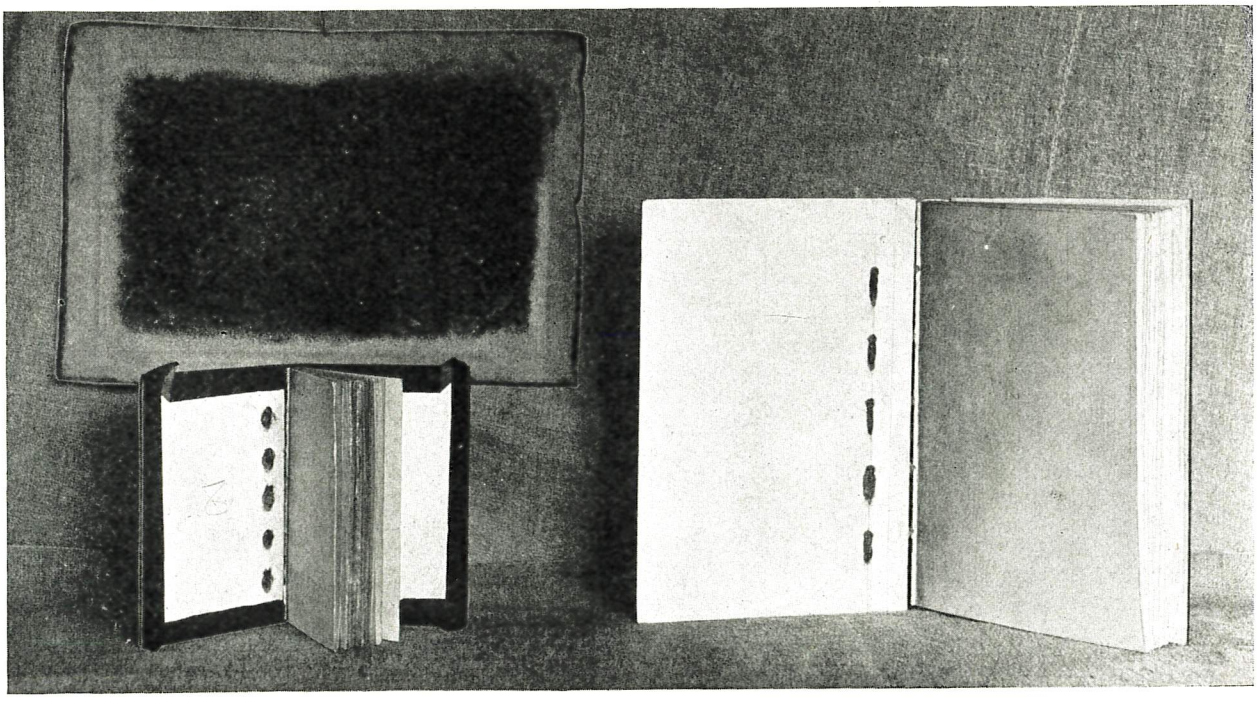


Figure 15. (Left top) Piece of leather pared. (Left bottom) Book covered—untrimmed. (Right) Cover open.

FUMING

F. M. Dorrans, University of Wisconsin, Madison, Wis.

EVERY wood finish has its period of popularity. At the present time the finishing of wood by fuming may be said to be one of the most popular finishes for high-grade oak furniture. This popularity is probably due to the fact that in fuming a chemical change takes place—as a result of the action of the ammonia gas and the tannin in the wood—which brings out the fibers and characteristics of the wood, rather than obscuring them as in the process of staining. A fumed finish grows softer and more beautiful with age. This is something that can not be said of a good many other finishes in which a stain is used.

Early History.

Our first ideas of fuming doubtless came from the English. It was noticed, in the old, well-built English stables, where unfinished oak had been used for beams and braces, that as time laid its mark on them, they assumed a beautiful, soft-gray appearance, that no stain or other treatment could give them. This change was brought about by the action of ammonia gas arising from the stable offal acting on the tannin in the wood. And, that is what really causes this change or finish: Ammonia fumes or gas acting on the tannin in the wood. The resulting color, or change, we call *fumed.*

Kinds of Wood to Fume.

The two best woods to fume are white oak and chestnut. It is true that other woods will fume, but it can hardly be said that they are enriched thereby. For example, when red cedar is fumed it changes to a brown color. *It has not been enriched.* This is because the characteristics of cedar will not lend themselves to fuming as readily as those of oak or chestnut. Chestnut lends itself more readily to fuming than oak, and the ammonia fumes penetrate much deeper because of the open grain. This is due also to the fact that chestnut contains a larger quantity of tannin than oak. Red oak does not fume well owing to the want of tannin.

The Accepted Finish.

The accepted finish for fumed work is a waxed or flat finish. The surface of the wood should never be filled or polished. A filled and varnished surface would take away the soft velvety appearance, and it is doubtful if such a finish would add to the beauty of fumed work.

Method of Fuming.

Any large box or closet that is air tight will be suitable. If it is not air tight, perhaps it can be made so by pasting strips of paper on the joints. The greater the quantity of work placed in a fuming box, the less it will cost to fume the individual pieces. In placing the work in the fuming box, it should be arranged in such a manner that there will be a space of at least one-half inch between any two flat surfaces. When it is necessary to pile pieces of work on top of each other, they should rest on thin strips of wood placed on edge. In this way the fumes will get between the strips and the work and a white mark on the surface will be avoided. It is also a good plan to have the endwood come in contact with the strips.

At the bottom of the box space should be left for a pan of ammonia. A broad shallow pan is best as it allows the ammonia to evaporate much more quickly. The ammonia should be placed in the pan and the door closed quickly. The box should then be kept closed for 24 hours or longer, depending upon the *quantity* of ammonia and the *color* desired.

The depth of color can be ascertained by the use of a test piece of the same material as that being fumed, in the following manner: A round pin is turned about one and one-half inches in diameter and about

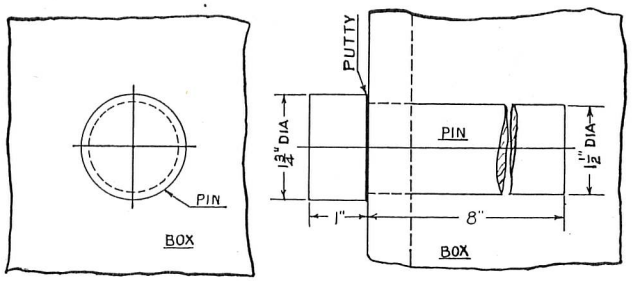


FIG. 1. TEST PIECE.

eight inches long, with a shoulder on it. (Fig. 1.) A hole the size of the pin is bored in the box, and the pin pushed in as far as the shoulder. In 24 hours, more or less, the pin is pulled out and a coat of oil applied to a part of it to see if it has attained the desired shade of color, if not, it can be placed in the box again. A little putty placed between the shoulder of the pin and the box will make the joint air tight. It is well also to have a temporary plug to place in the hole while the test piece is being examined. When the work is fumed and before the box is opened, it is well to open a few windows to cause a draft and so clear off the fumes of the ammonia quickly, altho the fumes in such quantities are not harmful. If, after a piece of work is taken from the box, it is found to be too light, it may be placed in the box again and the fuming continued. If too dark let it stand around the shop in the light, and it will turn lighter. In both cases this must be done *before* oiling and waxing.

Fuming Box.

In Figure 2 is shown a fuming box made from old window sashes. The sashes are held together with screws. By this method of fastening the box can be taken down or extended as required. A little door is placed at the bottom of the box so that the ammonia can be placed in quickly. The joints that are not air tight are taken care of by gluing strips of paper over them. Sand has been used to get an air tight joint between the sashes and the floor. The sand should be tamped down finally with the foot. The glass affords an opportunity to watch the progress of the fuming. The fuming box should be placed so that the light will

strike on all sides, or it should be kept in the dark. Streaks of light getting into the box are apt to leave white streaks on the work.

Application of Oil After Fuming.

The next step after fuming is to apply a coat of oil. The oil consists of a mixture of one part each of boiled linseed oil and turpentine. This is heated as hot as can be applied by hand with a piece of cheese cloth. In heating the oil a bare flame should be avoided owing to the danger of the turpentine fumes catching fire. After oiling the work should stand for 24 hours, or until it is thoroly dry. If there should be any scum from the oil a little turpentine or benzine will remove it. The scum, however, is not likely to gather owing to the proportion of turpentine to the oil. It is the oil which forms the scum.

Waxing.

After the oil has sufficiently evaporated a coat of prepared wax is applied. This should be well rubbed into the pores of the wood and allowed to stand for a few minutes until it sets. The surface should then be polished by rubbing with a circular motion and finally with the grain of the wood. A second coat of wax is applied after the first is thoroly hard (this will take about 24 hours) and treated the same as the first. Natural or black wax may be used according to the shade desired. The black wax gives a little darker finish than the natural wax. The natural or light wax gives a soft grey appearance to the wood because the wax shows up light in the pores. A thin coat of white shellac may be applied before waxing. This gives a higher finish than when wax alone is applied, but without the same soft and velvety appearance which many people prefer.

Sapwood.

One important difficulty in fuming oak is that the sapwood will not fume to the color of the heartwood, irrespective of the length of time it may be subjected to the fumes of the ammonia. There is always a distinct line where the heartwood and sapwood meet. It is not always possible to tell just where the line is before fuming and sometimes the sapwood cannot be distinguished from the heartwood until fumed. When heartwood is present there is no mistaking it after fuming, and the question is how to fix it. Coating the work with various preparations before fuming has been tried but without any large degree of success. A good method is to fume the work and oil it all except the sapwood. Then apply one or two coats of a weak walnut water stain or a weak, commercial fumed water stain to the sapwood with a small brush until it is the same shade as the heartwood. When dry sand lightly, oil and proceed with the waxing and finishing.

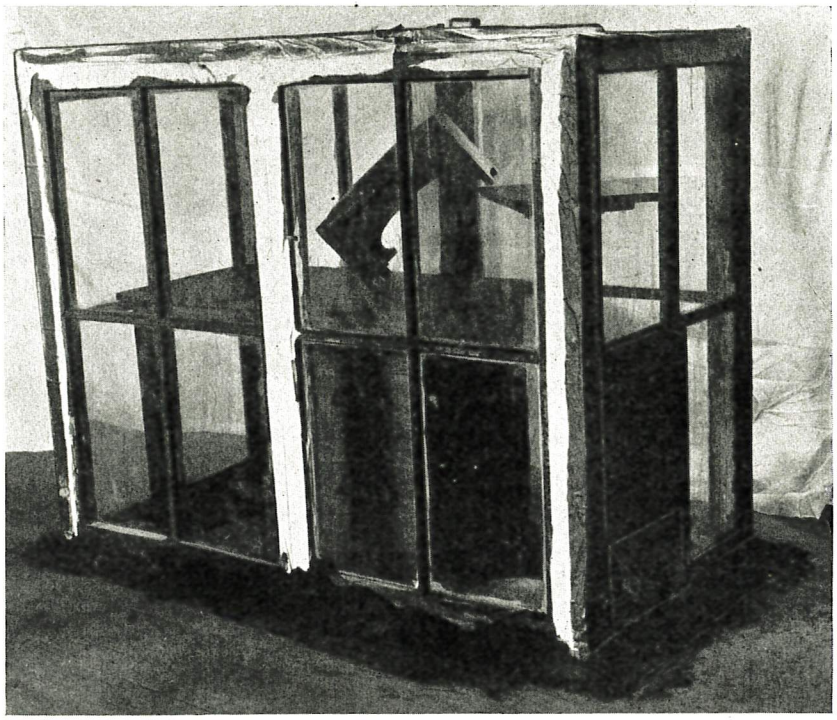


Fig. 2. A Fuming Box Made of Old Window Sashes.

Kind and Quantity of Ammonia.

Concentrated aqua ammonia of 28 per cent strength is best for ordinary school use. The 28 per cent represents the quantity of ammonia gas, and the remaining 72 per cent represents water. Ammonia may be had in the form of gas, called anhydrous ammonia, in steel cylinders. It is a gas that has been liquified under pressure and will expand into gas again when released from the cylinder.

Sometimes lime and aqua ammonia are applied to the wood to give a fumed effect. This is not to be commended, however, as it is difficult to get the lime off properly, and the liquid ammonia will raise the grain and give a rather harsh appearance.

It is well to remember that the larger the quantity of ammonia the more rapid will be the process of fuming. In most cases, where there is no particular hurry, a cupful of ammonia to a box four feet square, and four feet high will be sufficient. This amount will fume in about 24 hours.

The application of a solution of tannic and pyrogallic acid to the surface of the wood before fuming is often advocated to hasten the process of fuming and to help secure the required color in the sapwood. It has been the experience of the writer, however, that the solutions usually lie on the surface and obscure the grain more or less. The penetration is practically the same whether solutions are applied or not. The sapwood must be treated in any case, so there is not a great deal to be gained in this respect.

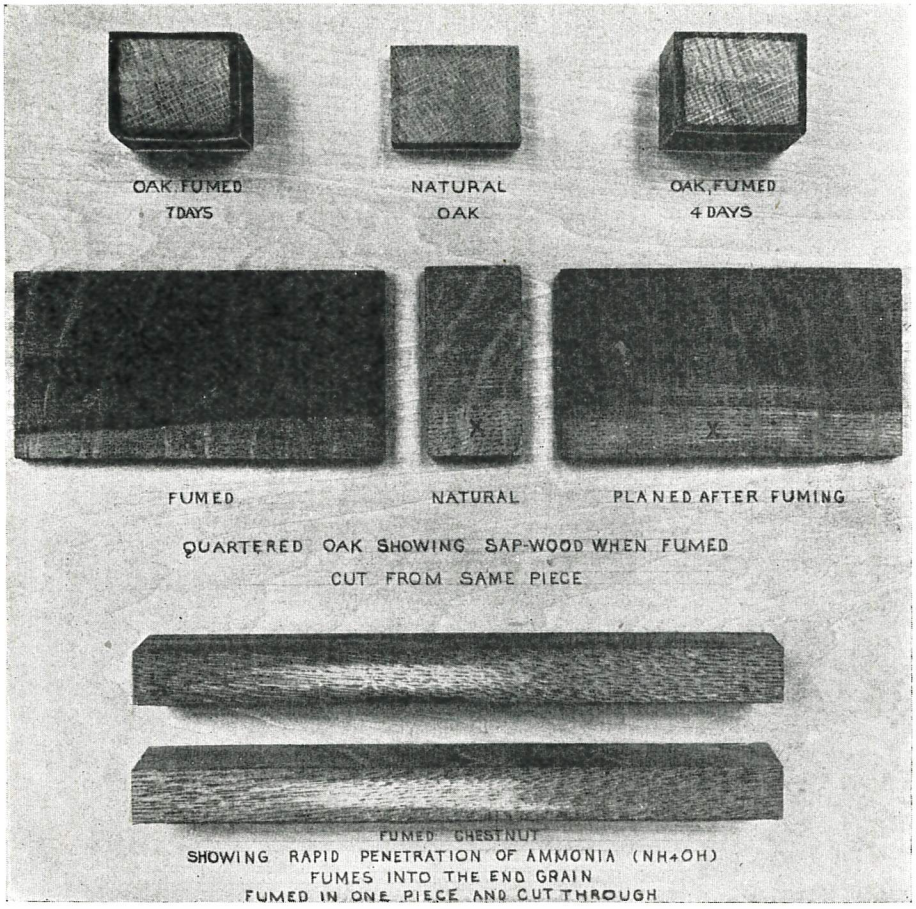


Fig. 3. SAMPLES OF FUMED WOOD.

Penetration and Strength.

In fuming the penetration is very rapid for the first six hours. After that it is slower, and at the end of 36 hours it is slower still, even with the addition of fresh ammonia. In Figure 3 the three top rectangular sections are of white oak. The one on the right has been fumed for four days and the one on the left for seven days. There is not more than one thirty-second of an inch difference in penetration between them. The section in the center was cut off before it was placed in the box. The flat pieces underneath the sections show pieces of quarter sawn white oak with a streak of sapwood. This was fumed for four days. It was all in one piece, the natural piece in the center was cut off before it was placed in the box. Notice the sapwood before and after fuming. The piece on the right has been planed slightly.

At the lower part of Figure 3 is a piece of chestnut that was fumed for four days. It was fumed in one piece and sawed in two. The center faces are shown turned out. Notice the depth of penetration. The piece has been fumed thru almost from end to end. The pieces in Figure 3 were all fumed at the same time and under the same condition.

Fuming has no effect on a glued joint, that is, if it is a good joint. It will not cause the joint to open up, nor will it harm thin veneer if it has been properly glued. It may, however, cause drawers or doors to swell slightly. The writer has found from experience that when possible it is well to leave drawers that are six inches or over in depth open three or four inches, or better still to take them out altogether when fuming, if this can be done without any inconvenience, and pile them up on top of one another in the fuming box.

Tests made on oak for strength show that it is almost as strong after fuming, as the same material that has not been fumed.

Upholstering of Fumed Oak.

When it is desired to upholster such work as stools, chairs, etc., this may be done to advantage before plac-

ing the upholstered article in the fuming box. In this way all scratches or marks from the process of upholstering may be more easily removed. The process of fuming will not harm or change the shade, or in any way effect the wear of the leather, real or imitation, or tapestry.

Fumed Stains.

The next best substitute to the fuming box is the fumed stain. This may be had in water, spirit, and oil, each one possessing some particular advantage over the other, for some particular work. Fumed stains have not the penetrating qualities of the ammonia gas, however, and require quite a little care in the application. The sapwood, as in the case of fuming, requires special attention and it is well when staining to leave the sapwood, should there be any, until the last, staining all but the sapwood. Then reduce a little of the stain with a solvent to about one-half strength—using the solvent that has been used in the manufacture of the stain—and apply to the sapwood. In this way the danger of having the sapwood darker than the main portion will be avoided, and a more uniform finish will be the result.

Advantages of Fuming.

The particular advantages of this finish are cleanliness and simplicity in the finishing process, also its deep penetration and lasting qualities. The soft, rich, velvety appearance of fumed work is hard to equal. There are no brushes to wash out, or clothes or benches soiled. It is not expensive and almost any boy can get good results. These features ought to commend fuming particularly to the teacher with large classes.

INDUSTRIAL ARTS DESIGN

William H. Varnum, University of Wisconsin

(Article 9)

SURFACE ENRICHMENT OF SMALL PRIMARY MASSES IN WOOD.

Enclosed and Free Ornament.

ARTICLE eight considered the general character of surface enrichment in wood together with the methods of developing continuous or repeating ornament (bands or borders). This leaves enclosed and free forms of surface enrichment to be considered in this article.

Enclosed Ornament (Panels). A panel is composed of geometric, natural or artificial ornament enclosed in a definite boundary of bands or lines and may be a square or other polygon, circle, ellipse, lunette, spandrel, lozenge or triangle. As it does not have the continuous repeating movement of the border, it is termed an enclosed area and is necessarily treated in a different manner from either band or border. Its object is to decorate a plane surface. It may be enriched by means of carving, inlaying or painting.

Free Ornament. By free ornament is meant motives not severely enclosed by bands or panels. It is generally applied to centers or upper portions of surfaces to relieve a monotonous area not suited to either panel or border treatment. It may have an upward or a radial movement dependent upon the character of the member to be enriched.

Summary. We then have three forms of possible surface enrichment, repeating or continuous motives (Article Eight), enclosed motives and free motives. Our next point is to consider where these may be used appropriately in surface enrichment.

Zones of Enrichment. The panel of a small primary mass of wood may be enriched at any one of three places or zones; first, at the margins; second, at the center; third, or over the entire surface. The exact position is a matter to be determined by the structural design and the utilitarian requirements of the problem. For example, a bread board or taboret top would require the area or zone of enrichment in the margin with the center left free. A table leg might require an enrichment in the center of the upper portion of the leg, while a square panel to be inserted in a door (Figure 233) would require full surface treatment.

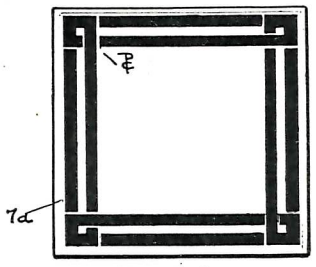
Point of Concentration. Each zone of panel enrichment should have one or more accented points known as points of concentration. The design should become more prominent at these places and cause the eye to rest for a moment before passing to the next point of prominence. The accented portion of the design at these points should be so related to the structure that it apparently reinforces the structure as a whole. Corners, centers of edges and geometric centers are salient parts of a structure; we shall therefore be likely to find our points of concentration coinciding with them. Let us then consider the first of these arrangements as applied to enclosed enrichment.

Marginal Panel Enrichment.

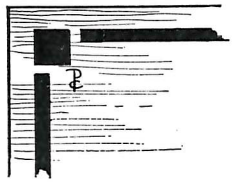
Marginal Zone Panel Enrichment. This method of enrichment may be used when it is impossible to enrich the entire surface because the center is to be used for utilitarian purposes or because it would be esthetically unwise to enrich the entire surface. The marginal zone is adapted to enriching box tops, stands, table tops and similar surfaces designed preferably with the thought of being seen from above. We shall call such surfaces horizontal planes.

As the design is to be limited to the margin, the panel outline is bound to parallel the contours, or outlines, of the surface to be enriched. It is well to start these enclosed outlines by creating a panel boundary by a line parallel to the outlines and from three-sixteenths to three-eighths of an inch away from them (Figure 218). The next step is to place the point of concentration in the marginal zone and within this figure. Common usage dictates the *corners* as the proper points. It may

· SURFACE ENRICHMENT OF SMALL PRIMARY MASSES IN WOOD ·
·MARGINAL ENRICHMENT OF SQUARE AREAS ·
·SYMBOLS: ℄ POINT OF CONCENTRATION; A INCEPTIVE AXIS ·
·TOOL PROCESSES· INLAYING AND CARVING ·

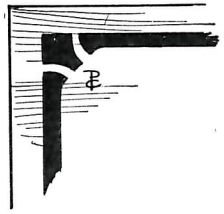


FIG· 218·



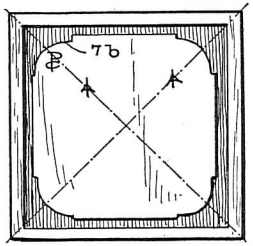
BAND MOTIVES SHOWING ℄ AT THE CORNERS

FIG · 219 ·

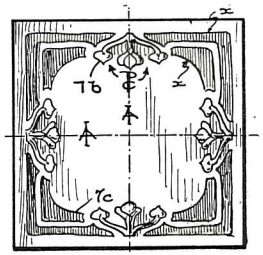


FIG· 220·

DIAGONAL USED AS INCEPTIVE AXIS

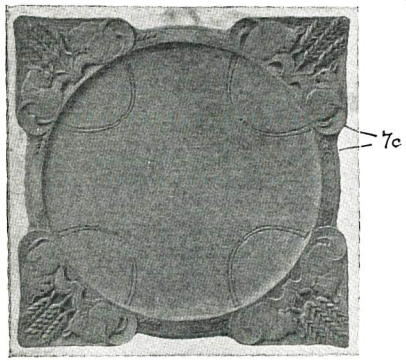


FIG·221 ℄ IN CORNER

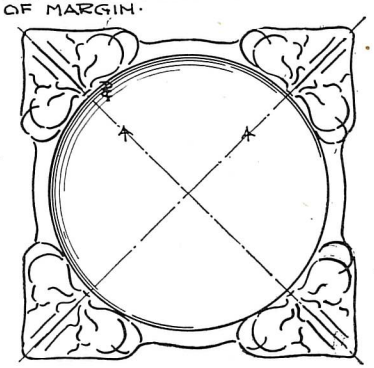


DIAMETER USED AS INCEPTIVE AXIS··

FIG·222·℄ IN CENTER OF MARGIN·



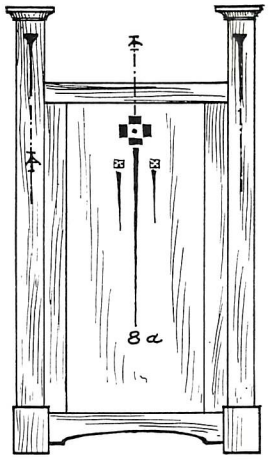
FIG· 223 —
CARVED MARGINAL ENRICHMENT



FIG· 224·
LEADING LINES FOR FIG·223·

Plate 31.

· SURFACE ENRICHMENT OF SMALL PRIMARY MASSES IN WOOD
·FREE CENTER ENRICHMENT FOR VERTICAL AREAS
·TOOL PROCESSES: INLAYING, LOW RELIEF CARVING



FIG· 225 —
INLAID· PAINTED· CARVED·

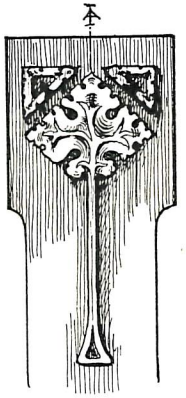
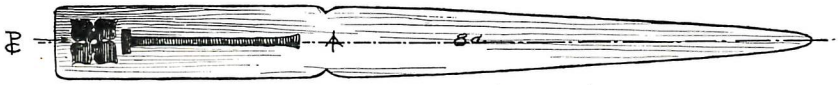
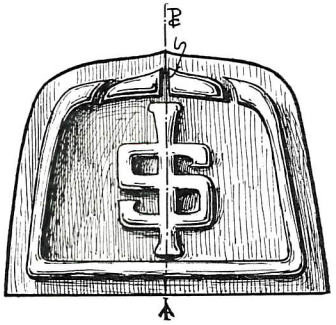


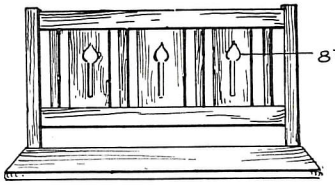
FIG. 226 ·FURNITURE DETAIL
LOW RELIEF GOTHIC CARVING·



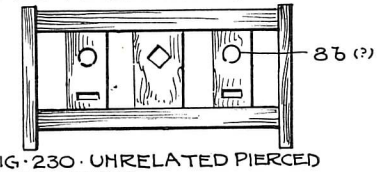
FIG·227· PAPER CUTTER· INCISED DECORATION·



FIG·228· BOOK STALL·
LOW RELIEF CARVING·
FREE AND MARGINAL ENRICHMENT·



FIG· 229· PIERCED ENRICHMENT·



FIG·230· UNRELATED PIERCED ENRICHMENT·

Plate 32.

be the designer's practice to use the single or double bands (Figures 218, 219, 220), with a single accentuation at the corners. The spots composing the point of concentration must have unity with the enclosing contours and with the remainder of the enrichment. Figure 220 is, in this respect, an improvement over Figure 219. But these examples are not *true* enclosed panel enrichment. They are the borders of Article eight acting as marginal enrichment. It is not until we reach Figure 221 that the true enclosed enrichment appears, when the panel motive is clearly evident. In this figure a single incised band parallels the contours of the figure until the corner is reached. Here we find it turning, gracefully widening to give variety and supporting the structure by its own increased strength. The single band in Figure 221 acts as a bridge, leads the eye from one point of concentration to the next similar point, forms a compact mass with the point of concentration, and parallels the enclosing contours of the enriched area.

In Figure 222 the point of concentration is to be found in the *center* of each margin. This bilateral unit is clearly designed on and about the center lines of the square panel. These points of concentration take the place of previous concentrations at the *corners* which were based upon the square's diagonals. While accenting based upon the center lines is acceptable, this means of concentration does not seem to so successfully relate the accented part to the structural outlines as that of concentration based upon the diagonals. The latter therefore is recommended for beginners. The corners of Figure 222 are, however, slightly accented by means of the bridging spots x-x.

Inceptive Axes. The diagonals and center lines of the surface enriched squares of Figure 221 and 222 and similar structural lines are to be given the name of *Inceptive Axes,* as they are center lines for new design groups. It may then be said that a strong basic axis or similar line depending upon the structure, may become the center line or inceptive axis upon which to construct a bilateral design. It is only necessary to have this inceptive axis pass thru the enrichment zone of the panel. Hereafter in the drawings, inceptive axes will be designated by the abbreviation I. A. while the point of concentration will be indicated by the abbreviation P. C.

The strongest plea for the inceptive axis is the fact that it interlocks surface enrichment with the structure, insuring a degree of unity that might otherwise be unattainable.

The carved enrichment of Figure 223 fully illustrates this point. The analytical study of this figure (Figure 224) shows the diagonal used as an inceptive axis, with the leading lines grouped about it at the corner point of concentration.

Free Enrichment.

Center Zone Enrichment. This method of surface enrichment is used to relieve the contour design of heavy mission legs and brackets or to distribute ornament evenly over the surface of lighter pieces of furniture. An example is noted in Figure 246, where the upper portion of the legs have center enrichment. As can be readily seen, the enrichment is generally free in character with little or no indication of enclosure. Figure 225 shows the application of free enrichment to a panelled screen or hinged door. The P. C. is in the upper portion of the door and re-echoed in the door frames, while the ornament itself is strongly dynamic in movement with a decided upward tendency in sympathy with the proportions of the door. This motive might be developed by inlay, carving or paint.

Figure 226 is a carved Gothic leaf, appropriately used as enrichment to heavy furniture. The unit may be raised above the surface or, even more easily, depressed or incised into the surface. The small corner spot is added with the intention of bringing the leaf into sympathetic conformation with the contours. Note how the center line of both units in Figures 225 and 226 coincides with the inceptive axis of the structure. Let it again be reiterated that this binding of the surface enrichment to the structure by means of the coincidence of the axes of symmetry and the inceptive axes causes the most positive kind of unity. No point of this form of enrichment should however, be carved sufficiently high to give it the appearance of being separated from the main surface.

Figures 227 and 228 are additional examples of free enrichment. Figure 228 has introduced by its monogram the individual touch of ownership so vital to the success of school designing. The monogram represents free enrichment while the border is marginal decoration with the point of concentration in the center of the top edge. Both types of enrichment are related to each other and to the structural contours.

Figure 229 is typical free *pierced* enrichment. The wood in the enriched portion is removed and the resulting figure supplies added lightness of construction and variety to the surface. One encounters this form of enrichment in the average school project with greater frequency than either inlaying or carving. It is with the thought of adding to the possibilities of school project decoration that the latter forms have been introduced. A word regarding the errors often encountered in pierced enrichment of the character of Figure 229 may not be amiss. Pupils, believing the square to be the last word in this form of enrichment, place the figure on the member to be enriched with little thought of its possible relation to the structural contours; the result is the un-unified design illustrated in Figure 230. To correct this, reference should be made to Rule 8b.

Full Panel Enrichment.

Full Surface Enrichment. This is the richest and most elaborate form when carried to its full perfection. It generally takes the form of a panel filled with appropriate design material. This panel may be used to enrich the end of a book stall and thus cover the entire surface or it may be inserted into a large primary mass and accentuate the center of a door in a manner similar to Figure 233. Its use, whatever its position, leads us to the consideration of methods of designing full panels.

Square Panels. In planning to design full panels, it would be well to consider: first, square panels; second. rectangular panels; third, varied panels. The point of

be even carried to the point of duplicating in reverse order the outside panels of the Tryptich.

Figure 245 again reverts to artificial motives, illustrated in free balance. The jet of steam is the unifying factor which brings the cup into harmony with the enclosing space. Figure 246 closes this article with illustrations of free balance and border enrichment from the industrial market.

Rules for Surface Enrichment of Wood (Continued).

Postulate: Surface enrichment should be inseparately linked to the surface and to the outlines or contours.

Enclosed Surface Enrichment for Partly Enriched Surfaces.

Rule 7a. Marginal Panel Enrichment should parallel or be related to the outlines of the primary mass, and to the panel it is to enrich.

Rule 7b. Marginal Points of Concentration in Panels should be placed (1) preferably at the corners or (2) in the center of each margin.

Rule 7c. To insure unity of design in Panels, the elements composing the Points of Concentration and the Links connecting them must be related to the panel outline and to each other.

Enclosed Surface Enrichment for Fully Enriched Surfaces.

Rule 7d. The contours of fully enriched Panels should parallel the outlines of the primary mass and repeat its proportions.

Rule 7e. The points of Concentration for a fully enriched Square Panel may be in its center or in its outer margin.

Rule 7f. Points of Concentration for fully enriched Vertical Panels should be in the upper portion of the panel.

Rule 7g. The fully enriched Panel and its contents should be designed in unified relation to the structural outlines, with the center lines of the panel coinciding with the inceptive axes of the structure.

Free Surface Enrichment.

Rule 8a. Free Ornament for partly enriched surfaces should be based and centered upon an inceptive axis of the structure.

Rule 8b. Free Ornament should be related and subordinated to the structural outlines and to the structural surfaces.

Fig. 246.

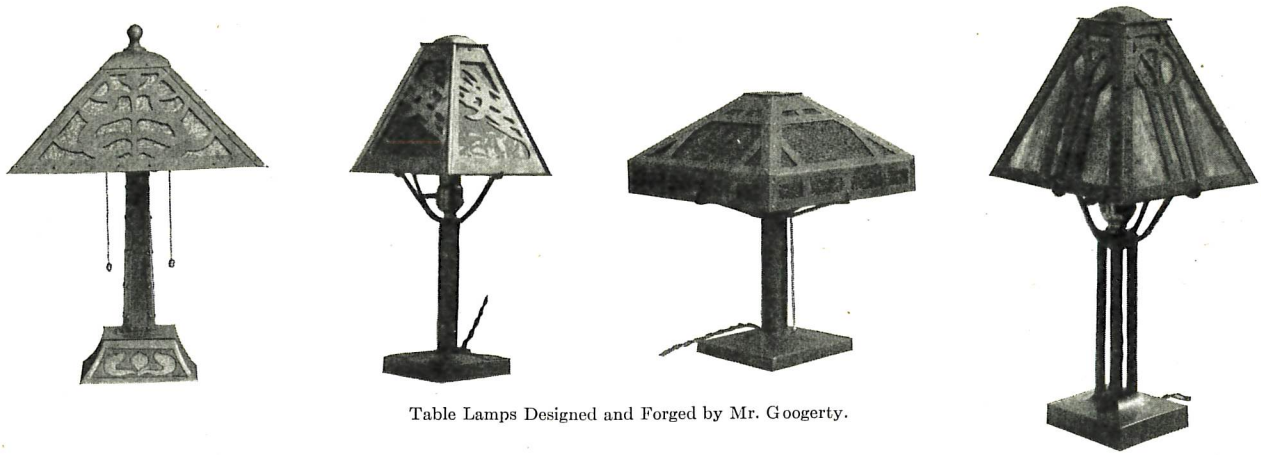


Table Lamps Designed and Forged by Mr. Googerty.

MAKING A PORTABLE WROUGHT IRON LAMP

Thomas Googerty, Pontiac, Ill.

IN Figure 1 is represented a portable lamp. This kind of lamp can be made in various sizes with one light, or more than one light. The lamp shown in the illustration, consists of two parts; the standard, and the shade, which can be removed. The standard consists of a box-shaped bottom, with a pipe screwed into it for the upright piece. The arms that the shade rests on, are separate and are held in position by the lamp socket, which is screwed down on them. The strips running over the bottom of the base and up the pipe are riveted in place. This gives the whole standard a more substantial appearance, and relieves the plain round pipe.

In making a very simple lamp of this character, we may eliminate the strips running up the pipe, and

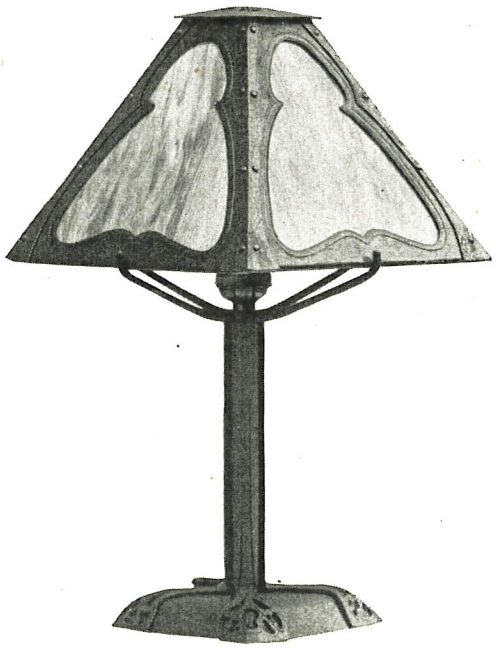


Fig. 1.

make the bottom with a round pipe screwed into it. Of course a square standard would be more in keeping with the square base and shade. In making the box-shaped base, soft steel should be used. Figure 2 shows the dimensions of the flat stock. The plate is heated and an inch of the edge is bent over the outer edge of the anvil, as shown in Figure 3. The outer edges of the plate can be bent over the end of the anvil as shown in Figure 4. When all the edges are bent the piece will

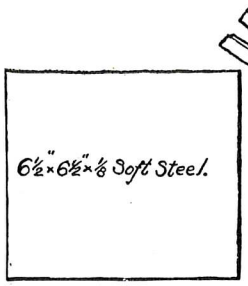


Fig. 2.

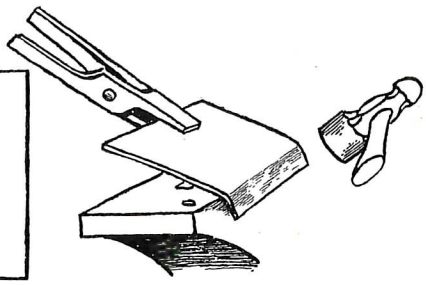


Fig. 3.

look somewhat as in Figure 5. The corners are now ground off, and the bottom is made level. A hole is drilled in the center and threaded for a ¾-in. steam pipe. Two inches from the center hole, another hole is drilled and tapped for a ¼-in. or ⅜-in. rubber bushing. In wiring the lamp, the cord should enter thru the bushing from the outside, and under and up thru the pipe to the socket. The drawing for the pipe is shown at Figure 6, also a bushing which is brazed into the top of the pipe and threaded for a ⅛-in. pipe. The ⅛-in. steam pipe and bushing are shown in position

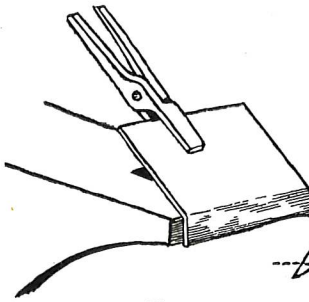


Fig. 4.

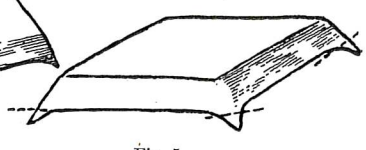


Fig. 5.

in the illustration at one end of the pipe. This small pipe is for the lamp socket to be screwed onto. The other end of the large pipe is to be threaded and screwed into the base. The pipe should be screwed into

the base far enough, so that the threads will not be exposed to the outside and the surplus cut off. The pipe when screwed tight should be brazed to the base. In doing this, the borax and spelter should be applied

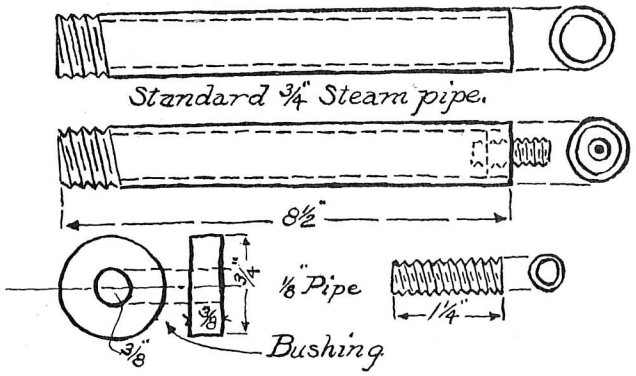


Fig. 6.

to the under side, as the brass will discolor the iron. When the pipe is brazed it should be made to stand vertical.

In Figure 7 is shown the lamp standard with the shade support in position. The support has a hole in

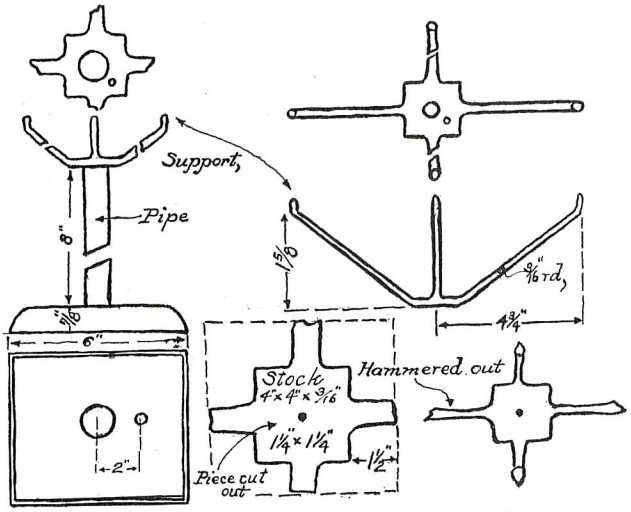


Fig. 7.

Fig. 8.

the center to fit the ⅛-in. steam pipe at the top of the standard. When the support is in place another ⅛-in. hole is drilled thru it into the pipe. A pin is driven into the hole so that the support cannot be moved around. The lamp socket when screwed down makes the support tight. In making the support the center part is cut from a plate 3-16 in. by 4 by 4 in. and 3-16 in. round soft steel bars are welded on for the arms. In Figure 8 is shown the drawing which does not need explanation. The drawing for the shade is shown at Figure 9 and the pattern for one section at Figure 10. In developing the pattern which is very simple the top

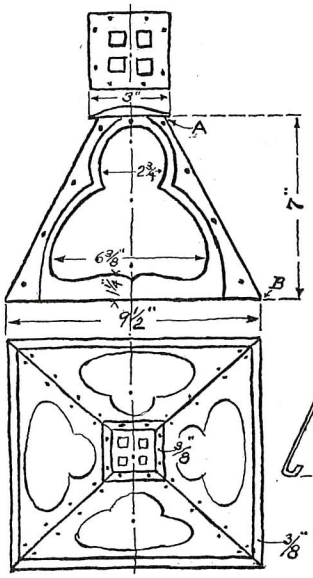


Fig. 9.

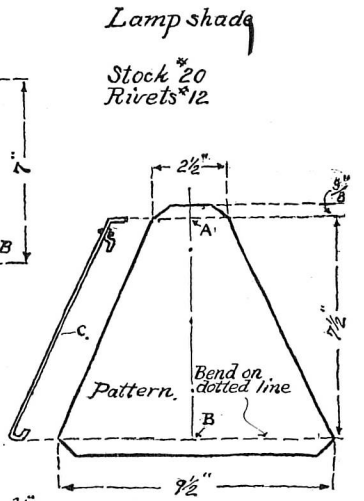
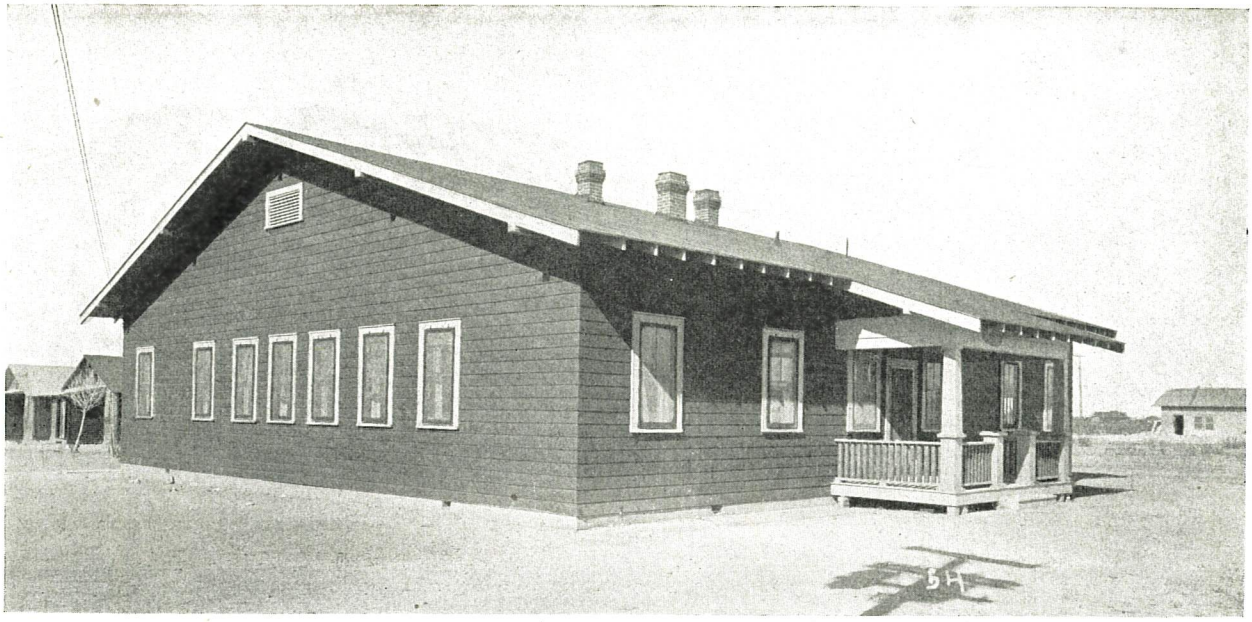


Fig. 10.

drawing, Figure 9, represents the shade which should be drawn full size. The length from A to B is then laid off on the center line of the pattern, which in this case measures 7½ in. The top and bottom of shade shows a return of ⅜ in. which should be added to the length of the pattern. The width of the top and bottom of the shade is then drawn, also diagonal lines which will complete the pattern. The edge view of the pattern is shown at C. The ⅜-in. bend at the top is made so that the cap can be riveted on. The one at the bottom is to receive the glass. This was explained in a previous article describing the making of a hall lantern. In assembling the shade, corner angles are used to fasten the sections together, which was also explained for the hall lantern. The top cap is put on last and fastened with rivets.

DISCIPLINE is the first step in efficiency, and discipline comes from a wise selection of men whose welfare is made important as the enterprise itself.—*Bridgeport Artisan.*



GENERAL VIEW OF THE COTTAGE.

BUILDING A DOMESTIC SCIENCE COTTAGE

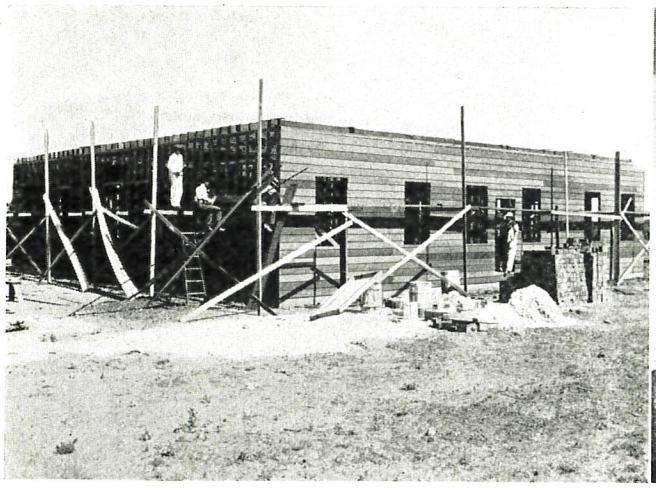
Howard B. Ross, Director Industrial Department, Douglas, Ariz.

DURING the summer of 1913, Mr. E. M. Stauffacher, a graduate of Stout Institute, with the aid of eight students under the direction of the Director of Industrial Work, constructed our Domestic Economy Building. The building is 57 feet by 57 feet on the foundation. It contains a sewing room, fitting room, bedroom and store room; also, a living room, in which the furniture and draperies were made by the girl students; a dining room, pantry, kitchen with storeroom; a laundry complete with set tubs, ironing board and electric irons.

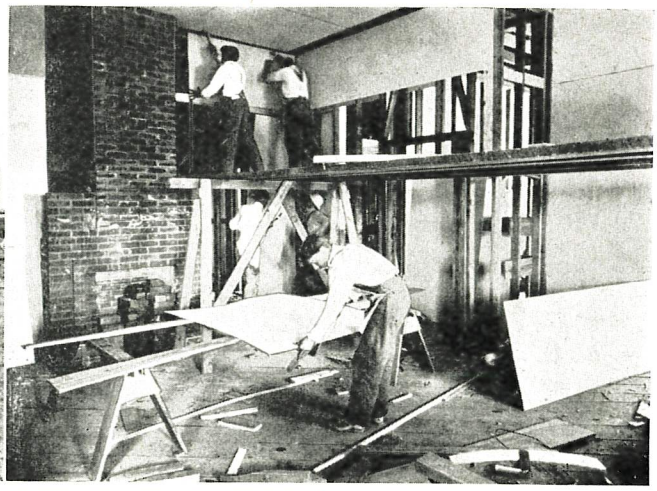
The building is of frame construction, finished on the inside with beaverboard, and cost $2,500. All of the electric wiring was done by the boy students, as well as the construction of the fixtures for the living and dining rooms. The illustrations show very clearly the details of construction.

During the same summer, a basement was excavated and room made for another shop, to be used primarily for grammar school work. The arrangement of equipment and the planning of the same was completed after a most exhaustive study. Individual lockers for class-work were built. Oilstone, nail and supply cabinets, tool boards, demonstration pit and a lumber rack of iron pipe were made and placed in the shop. A 30 inch Fay and Egan band saw was installed recently.

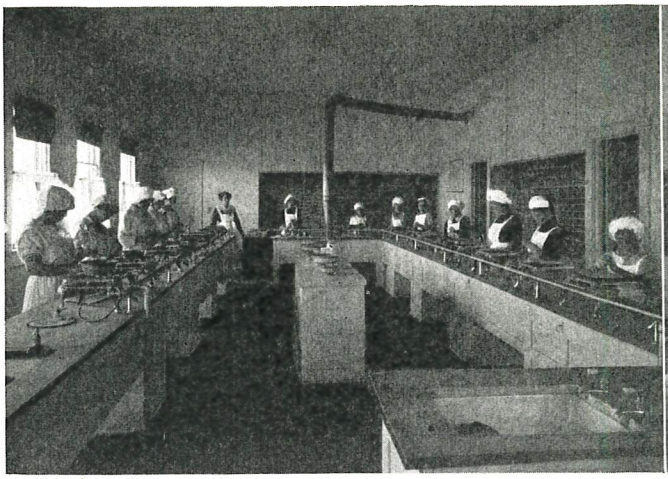
In the main shops, we are equipped with a 36 inch Oliver band saw, drum sander built by the students, jointer, combination saw bench, Fay and Egan 24 inch single surfacer, twelve lathes for wood-turning, eight of which were installed in 1913, when the school board appropriated $2,750 for industrial work. This included



Housing in the Cottage.

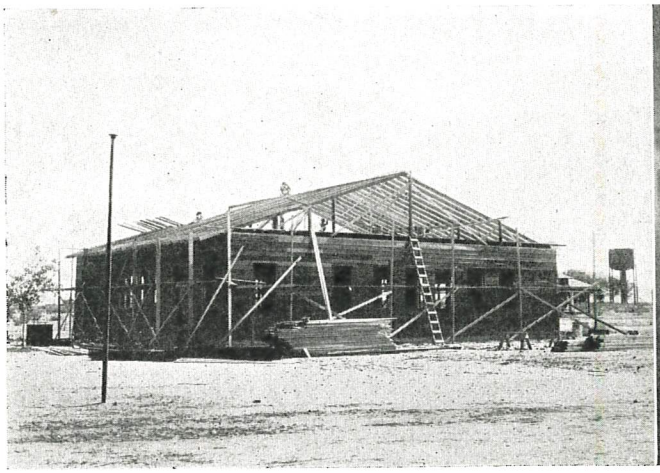


Beaver Boarding the Rooms.

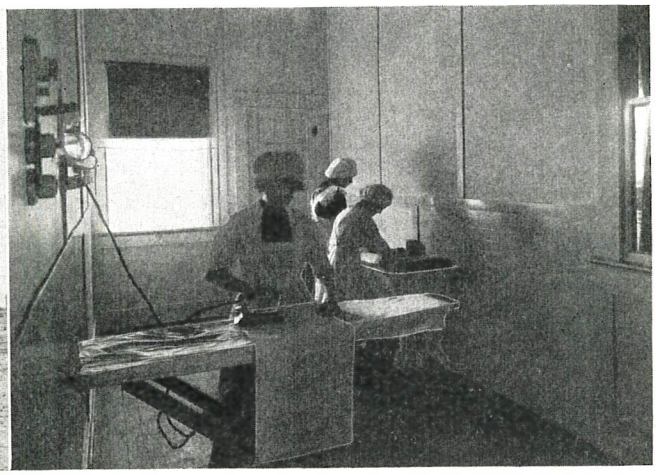


The Kitchen.

The Sewing Room.



Framing the Roof and Housing In.



The Laundry.

an equipment for the grammar school shop, lathes and equipment for machineshop, consisting of a 14 inch Champion Change gear machine lathe with taper attachment, a motor-driven drill press of 24 inches capacity, a forge and individual bench equipment.

We hope in the near future to install additional lathes and shaper, forges and wood-turning lathes and to make a number of changes in our drafting room equipment.

Industrial work is taught in all grades from the fifth thru the fourth year in the high school. Furthermore, the students of the department have built playground apparatus valued at $800, and have also cared for the repair work.

ONE ought never to forget that by actually perfecting one piece one learns more than by beginning or half-finishing ten. Let it rest, let it rest and keep going back to it and working at it over and over again until there is not a note too much or too little, nor a bar you could improve upon. Whether it is beautiful also is an entirely different matter, but perfect it must be . . . . perfected unassailable.—*Johannes Brahms.*

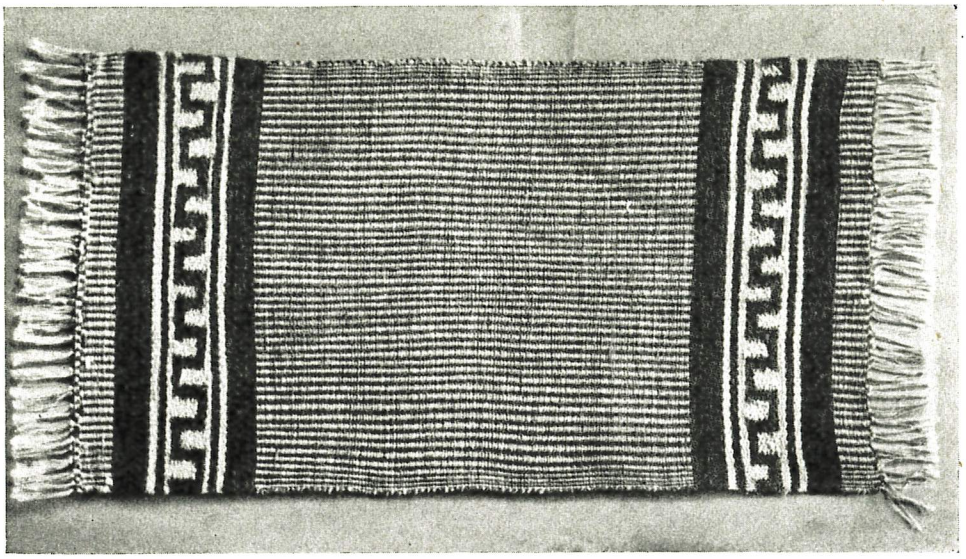


Illustration 6.

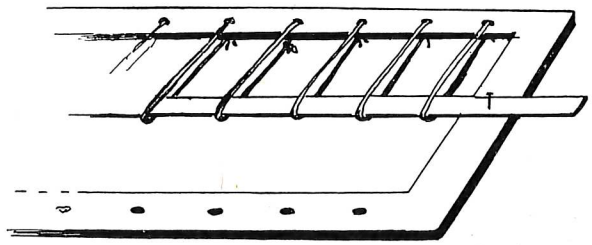
RUGS AND RUG WEAVING

Agnes Lumsden, High School, Marion, Virginia

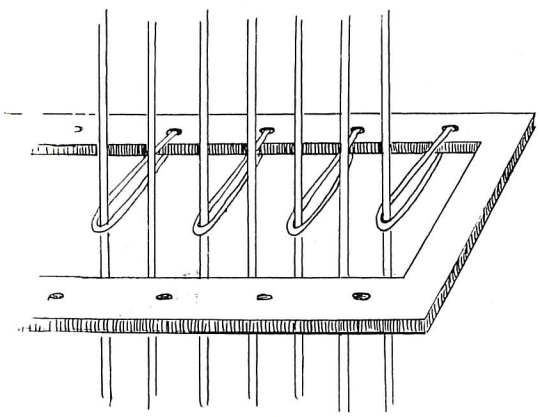
COLONIAL or rag rugs were never in greater favor than at the present day. They have a beauty and old-time charm that bring at once to the home an air of comfort and restfulness.

An interesting feature of these rugs is that they are adapted for use in so many places. For bedrooms, living-rooms, halls—or, as our forefathers used them in front of doorways and fireplaces—they are ideal. With them a room on the porch may be made as dainty, as inviting and as comfortable as one's own room within the home.

They lend personality and charm to any home but in a much greater degree when they are hand woven and perhaps designed by the weaver.



First Step in Stringing Loom, Showing Slat Temporarily Tacked on to keep the Loops of same length.



Second Step in Stringing Loom.

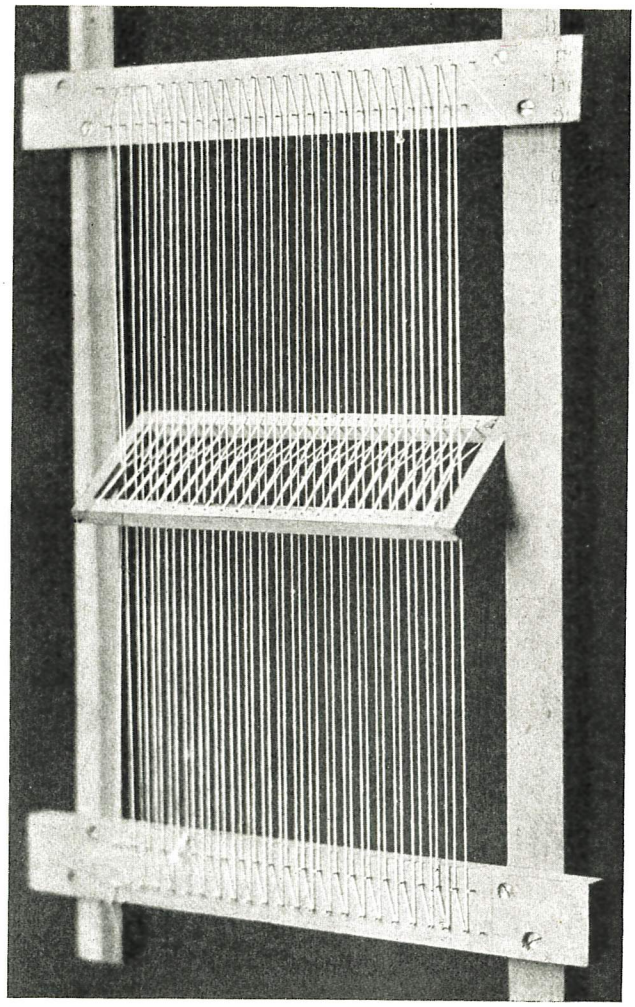


Illustration 1.

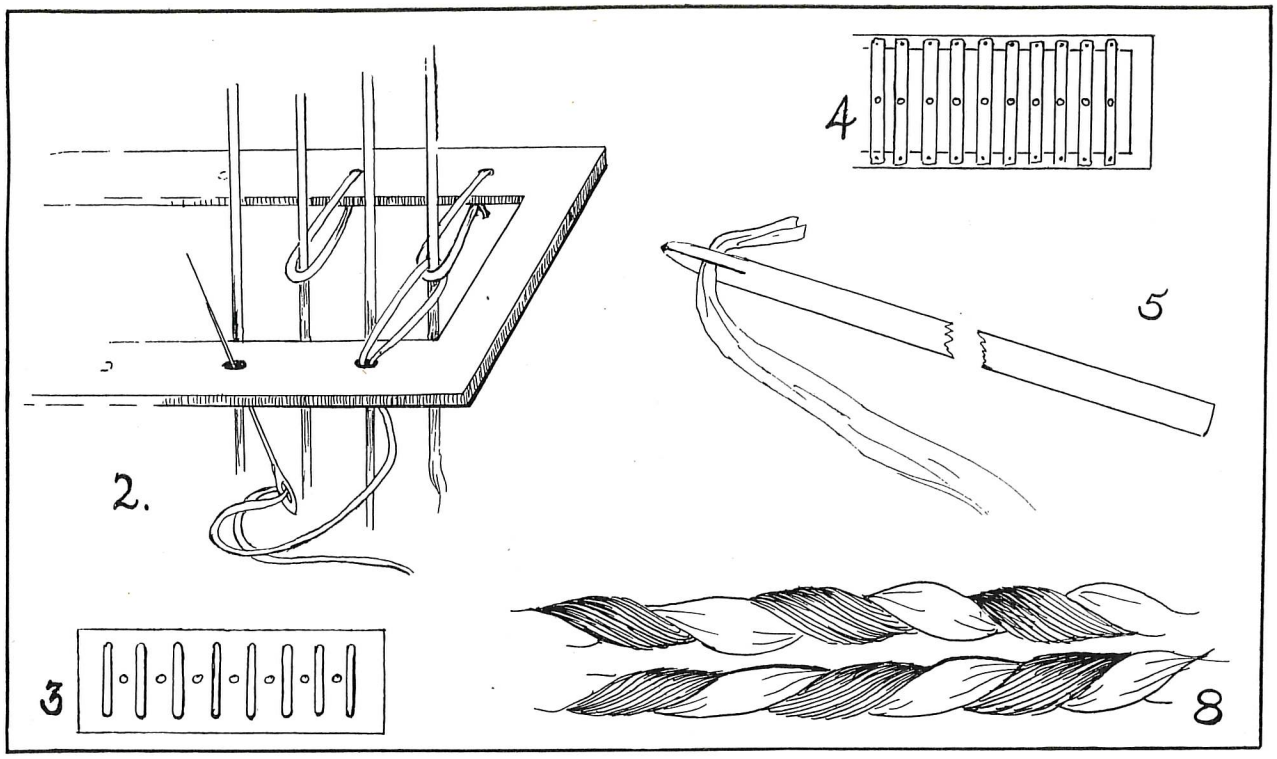


Illustration 2. Showing how last row of loops may be connected. 3. Heddle. 4. Whale Bone Heddle. 5. Improvised Wooden Shuttle. 8. Rags twisted for Vine Pattern.

And what more charming occupation for school children could be found than weaving rugs that can be used in their homes? And as the occupation is so varied as to the articles made, the materials used and the method of work it can never become tiresome and can be suited to children of several grades.

Boys in the third grade can make the looms which are only strong frames, the end pieces nailed or screwed on top of the sides. The inside measure of these frames should be six inches longer and about the same number of inches wider than the rug you wish to make.

Across each end piece drive small nails or brads one-fourth inch apart or two rows as shown in illustration, the brads one-half inch apart in each row and alternating in position thus making the warp strings one-fourth inch apart.

Make small frame about five or six inches wide and long enough to work easily between the sides of large frame. (See illustration 1.)

Make small holes along each side of this frame one-half inch apart and exactly opposite each other.

Alternate warp strings are held by loops tied thru these holes as shown in illustration 2.

A heddle can be made of a sheet of metal as shown in illustration 3, one warp string passing thru a slot, the next thru a hole.

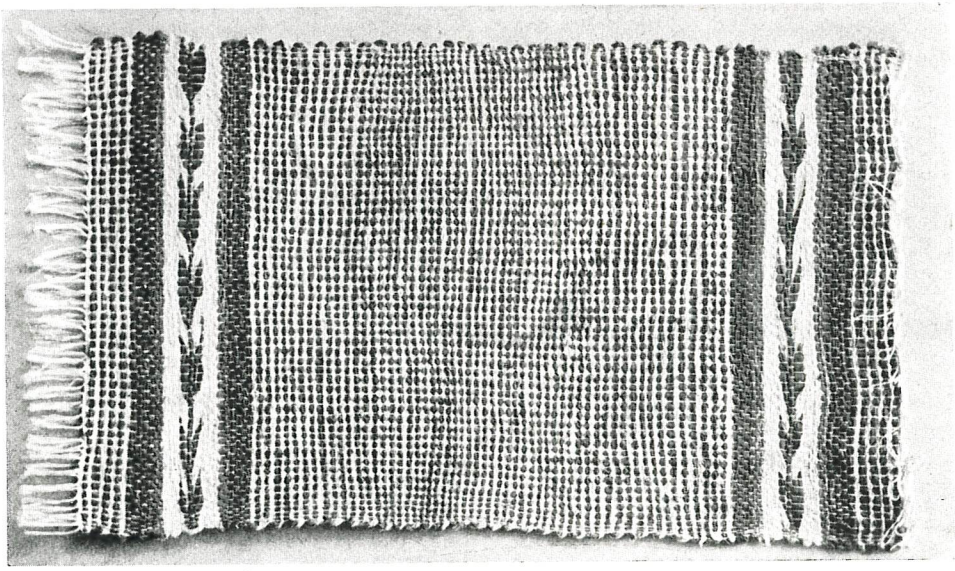


Illustration 7.

Another heddle is made by tacking narrow whalebone or metal strip across the small frame. (Illustration 4.)

The advantage of the one with cord loops is that while it can easily be slipped up or down on the warp by turning it up parallel with the warp, it will stay wherever placed and will not drop down and get in the way of the weaver.

A stronger edge may be made along the sides of rugs by placing the brads one-eighth inch apart and the holes in the heddle one-fourth inch apart at the sides.

It has been found best to tack the rags while weaving. Little time is lost and no shuttle is then needed.

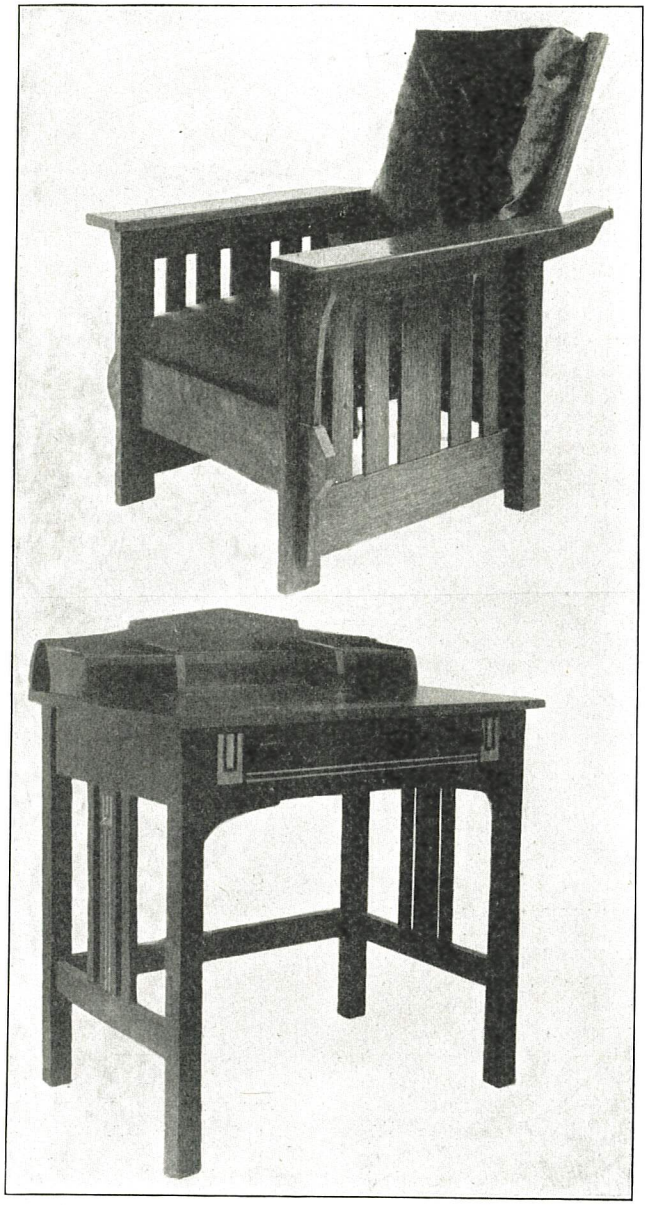
A smooth-pointed stick with a split end for holding the rag takes the place of a shuttle. (Illustration 5.)

Successful work has been done by third-grade pupils both in making looms and weaving rugs, but the designs used are made in drawing classes in higher grades.

In weaving patterns as seen in illustration 6, weave the design first then fill in groundwork.

The vine pattern shown in illustration 7 is made by twisting rags in opposite directions and weaving as one string. (See illustration 8.)

Weaving can be done very rapidly while standing erect and is good exercise. It also affords a wide range for design and color schemes.



Students' Work at the Northern Normal and Industrial School, Aberdeen, S. D. Mr. H. P. Gerber, Director of Manual Training.
Oak chair, with spring cushion, made by young man student. Walnut desk, with inlay, made by lady student.

AGREEMENTS WITH EMPLOYERS

Raymond C. Keople, Department of Vocational Education, Rochester, N. Y.

THE HON. WILLIAM C. REDFIELD, Secretary of the Department of Commerce, declared in his statement before the Commission on National Aid to Vocational Education, that positive instruction in the trades is essential to the progress of the country socially and industrially. There is hardly a household of a mechanic which is not suffering because the father has been untaught and untrained, and there is hardly a factory where the problem of incompetent labor is not a curse.

Take the case of Harry B., a boy of sixteen years of age, whose working record since leaving school is as follows:

Kind of work.	*Length of service.*	*Reason for leaving.*
Messenger	2 mo.	Discharged
Department store	2 wks.	Discharged
Delivery boy	2 wks.	Discharged
Office boy	3 wks.	Discharged
Bundle boy	1 wk.	Discharged
Office boy	2 wks.	Discharged

Something is decidedly wrong here. What is it? In the first place he had no special vocational training; and, in the second place, he had no one to help him get into the proper kind of work.

We are now trying to do both for our boys and girls in Rochester. We have our vocational schools with their varied courses in which the boys and girls may learn a trade. We are also trying to help the boys and girls to find the right job. It certainly would be the height of folly to train and turn out fifty boys for a certain line of work when the industry can care for only half that number. The rest would have to drift into whatever jobs offered themselves, and the economic waste to both employer and employe would be greatly increased.

One of the best methods of regulating the output is the contract with the employer, and one of the best agencies, if not the best, thru which to secure this cooperation is the Chamber of Commerce. In Rochester our Chamber of Commerce has an Industrial Education Committee composed of about thirty business and professional men, who are working out problems of education and business. As a result, we have secured several agreements with employers. The first agreement to be secured was an agreement between Rochester Typothetae and the Rochester Shop School, the terms of which in substance follow:

> "The term of apprenticeship shall be four years, three months of which shall consist of a 'try out' course at the Shop School. During this preliminary course the fitness of the pupil for the printing trade shall be determined.
>
> "Upon completing this course, the pupil may enter employment as an apprentice, the Typothetae agreeing to provide places for a certain number of pupils each year. The apprentice shall alternate weekly, between the Shop School and the printing plant, and is to receive from the employer a weekly wage of $4 for the balance of the first six months; $4.50 for the second six months; $5 for the third six months, and $5.50 for the fourth six months. The employer is to pay wages for the school as well as shop time.
>
> "After this period, he may devote the remainder of his apprenticeship entirely to the shop, and for which he shall receive $9 per week for the first six months; $10 for the second six months; $11 for the third six months, and $12 for the fourth six months. During this time he shall be considered under the supervision of the Shop School, and upon completion of the school term and apprenticeship, having passed the examinations and being graduated from the school, he shall receive from the employer as a bonus, in addition to his salary and not as a part thereof, the sum of one hundred dollars."

A committee from the Typothetae has been appointed to supervise the scheme, keep it working, and care for the boys as they leave school.

Another agreement is one we have with the employers of machinists. During the summer of 1913 I made a survey for the Chamber of Commerce of three industries: Woodworking, Machine and Metal Working, and the Clothing Industry, visiting over 300 factories. As a result of this survey I found that employers have been unable to secure enough boys, with or without experience, and that they would welcome any attempt on the part of the school authorities to train boys for the machinist trade. When the tentative agreement which I drew up after consulting the employers was ready, a few of the leading manufacturers were called together at the Chamber of Commerce rooms and the plan was discussed in detail. Every employer present was enthusiastic over the plan, so that when the big meeting was called on the fifth of February, 1914, these men were able to convince their fellow employers that the plan should be adopted, leaving it to the schoolmen simply to answer questions regarding the training to be given.

The plan as endorsed follows:

1. That the Shop School shall give to boys who are not less than fourteen years old and who have completed at least the sixth grade, or preferably to boys who have completed the work of the elementary schools, a general industrial or "try-out" course of such length as the school authorities may deem necessary, and shall select those who have an aptitude for and an ambition toward the trade of machinist.

2. That the Shop School shall give boys thus selected a preparatory course, of approximately two years, one-half of each day being spent in shop practice and the other half in the study of shop mathematics, mechanical drawing, applied science, industrial history, civics, and English.

3. That upon the satisfactory completion of this course the metal trades employers of Rochester shall employ these boys in such numbers as trade conditions and shop management shall warrant, at the following schedule of wages:

   $8.00 for the first six months.
   $9.00 for the second six months.
   $10.00 for the third six months.
   $11.00 for the fourth six months.

   In the event any boy by piece work earns more than the scale, the balance shall be held back and paid to the boy as a bonus at the completion of the two years' apprenticeship.

4. That during the two years the employer shall allow each boy, during working hours, an amount of time off equivalent to one-half day each week, for continuing his studies, such time to be taken when conditions best permit.

5. That the first three months of employment, as provided in Articles 3 and 4, shall be considered a probationary period, and the diploma of the school shall not be awarded until the satisfactory completion of this probationary period.

6. That the members of the Machine Industry shall select a committee of three of their number who shall:

   (1) Inspect frequently the work of the Shop school and offer criticisms and suggestions for the improvement of the work.

   (2) Suggest tests that shall measure the pupil's progress in manipulative skill and technical knowledge.

(3) Suggest tests that shall measure the qualifications of boys for graduation.

Forty-three representatives of twenty-seven establishments voted that this plan be adopted and put into operation.

Requests for boys have come from the leading firms of the city, and from practically all of the smaller machine shops. In September, 1914, 45 boys were receiving training in the Machine Department of the Shop School. Thirty of these boys will be ready for graduation in 1916, and each boy in September last had a place secured for him.

A committee of three, as specified in the terms of the agreement, visits the shop from time to time and offers suggestions. Occasionally employers visit the shops and, looking over the boys, pick out one or two whom they would like to secure at the end of their course. The boy has not only a definite job ahead of him, but a definite shop and employer; certainly a far call back to the time when a boy left school and roamed the streets looking for help-wanted signs.

The Master Painters and Decorators' Association of Rochester has also made an agreement to provide training for boys under 16 years of age in painting, paper hanging and decorating. The agreement drawn up provides in substance as follows:

1. The Shop School shall give a "try-out" course and shall select those who have an aptitude for the trade.

2. The School shall give boys thus selected a preparatory course of approximately two years, one-half of each day being spent in shop practice and the other half in the study of Shop Mathematics, Mechanical Drawing, Applied Science, Industrial History, Civics and English.

3. Upon completion of this course the painting employers shall employ these boys, as conditions warrant, at the following scale of wages:

$2 per day for the first year.
$2.50 per day for the second year.
$3.00 per day for the third year.

4. The members of the Painters' Association shall select a committee of three who shall, first, inspect the work of the Shop School and offer suggestions and criticisms for the improvement of the work; second, suggest tests of the pupils' skill and technical knowledge; third, suggest tests for graduation.

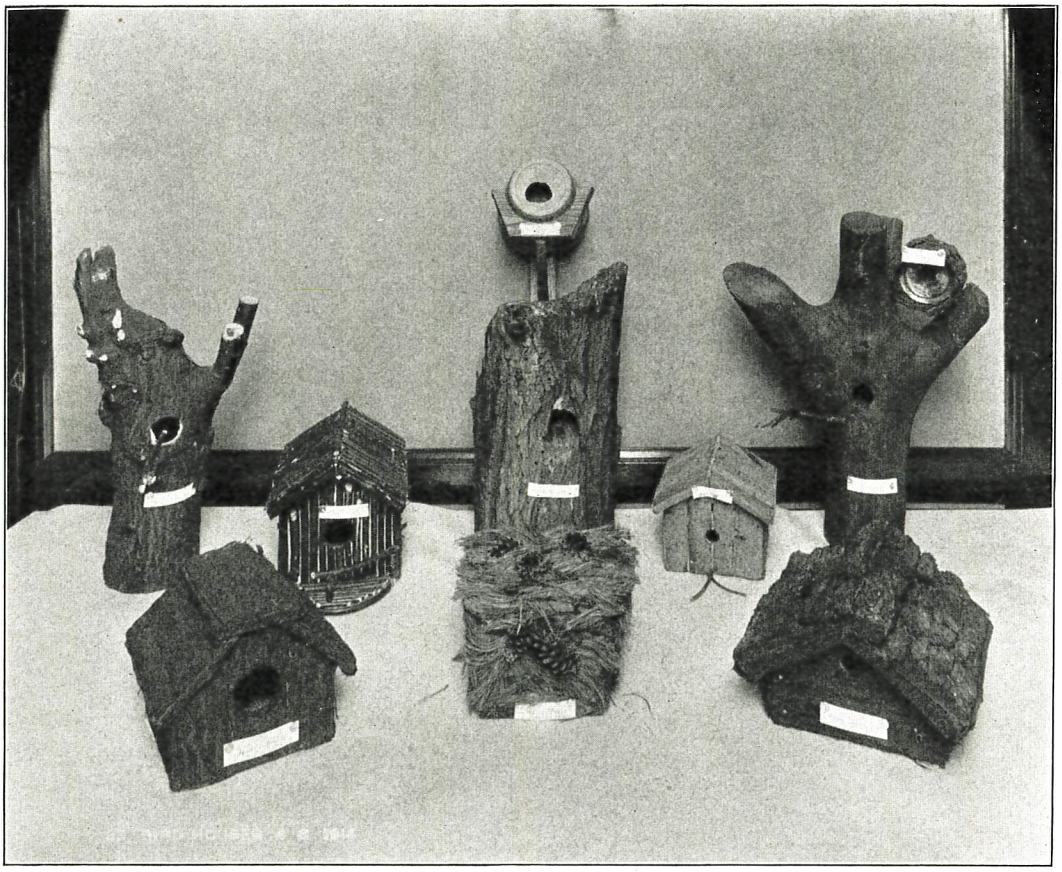
At a recent meeting of the employers of painters, sixteen, or all who were present, agreed each to take a boy in 1916.

Similar agreements have been made by employers of girls in the garment and button industries.

Requests have also been received from one of the large stores, asking us to supply them with girls to act as sales ladies on Saturdays. These girls are given some special training at the vocational school and have been working Saturdays for several weeks.

The instructors from the vocational schools have called upon the dressmakers and milliners of the city. As a result, employers are taking our girls in preference to those without training, and at the present time every girl who left the vocational school is employed in a good position, receiving good wages, and in line for advancement.

So far, we have experienced no trouble whatever in securing agreements with the employers. As previously stated, the greatest help in this work has been the services rendered by the Chamber of Commerce in pointing out to the employers the necessity of co-operation in this work.—*Address.*



BIRD HOUSES MADE IN THE PITTSBURGH GRADE SCHOOL SHOPS.
MR. FRANK BALL, DIRECTOR.

INDUSTRIAL-ARTS MAGAZINE

EDITORIAL

A POSITION LOST.

A MOST capable and intelligent young man made application for a position as teacher of manual training in one of the good towns of Illinois. He failed to get the position, much to his surprise. The reason assigned by the president of the board of education was that "he misspelled three words in his letter of application!"

There are some who will probably regard this as a trivial excuse. But people generally consider that there are some of the arts of civilization which everyone should master to a reasonable degree, before he assumes to teach the boys and girls whom we tritely, and rightly, call "the hope of the nation."

If there are such arts, and we believe there are, certainly reading, writing and spelling are among them. More and more, the teachers of the various lines of industrial work are going to be held to the standards of those of other lines, in the arts and accomplishments which the experience of people have shown to be fundamental to the best and most satisfactory life.

It is most unkind to the profession of manual training teaching for anyone to give as an excuse for poor English, writing, or spelling, that he is "simply a teacher of manual training." Let us rather, make this fact a genuine reason why *more* instead of *less* should be expected of us.

A SUGGESTION.

IT is always much easier to criticise another's work than to perform the task properly. It is also quite expedient to remain silent regarding another's shortcomings when undertaking to perform a similar task. There is always a possibility of the other fellow's having the opportunity to find faults such as have been found in his work in the work of his critics.

The National Association of Corporation Schools in its conventions has devoted considerable time to criticism of the public schools and their attempts to inaugurate industrial education. The Association has now been in existence long enough to be asked to show what it has accomplished.

It has held three conventions, which have been admirably planned and managed. One would naturally suspect that there are some shrewd advertising men on the executive committee. The published proceedings of these conventions are prepared, printed and bound in excellent shape.

The published lists of persons competent to address public audiences on the subject of industrial education have probably secured speaking engagements for a large number of the Class A members. The monthly bulletins have attracted considerable attention.

But conducting well advertised conventions, publishing reports and bulletins, and making platitudinous speeches is not contributing much to the cause of Industrial Education. Like the darky in the storm, we are praying for more light and less noise.

It is to be hoped that this group of able men and women will in the near future turn their attention to the development of methods of teaching industrial subjects to young persons seeking preparation for the industries. This is the real problem and when this organization devotes its attention to its solution, then and not until then, may we hope for some contribution to the cause of Industrial Education from the National Association of Corporation Schools.

A LESSON IN COOKING.

THE time given to any of the industrial arts is so short and so precious, that it seems a pity to have any of it wasted. Yet, the best teachers are sometimes found following practices into which they have fallen and which result in much loss both in interest and time.

A lesson in cooking was observed not long ago which illustrates the point. The recitation was conducted by a teacher reputed to be one of the very best teachers of foods. After a few directions by the teacher, the students were asked to copy some recipes which had been placed on the blackboard. With the exception of the very short time occupied by the teacher's oral directions, the students spent the entire hour copying what the teacher had previously written on the board, while she sat and leisurely looked on. Certainly the time of the teacher was wasted, and we are inclined to believe that most of the time of the students was likewise wasted, when we consider what might have been accomplished in the same time under a wiser arrangement.

Undoubtedly, the students must have the recipes but must they spend the recitation periods in copying them? Cannot a better method be devised? There is a great opportunity awaiting those who will intelligently, and effectively, work out and present a method of procedure in such lines of work which will eliminate the tremendous waste of time, make possible a better organization of the material, and give a more effective means of presentation of the organized material.

THE PRICE OF FAILURE.

THE following is an actual instance of the "penny wise" policy of school officials in some communities: An excellent and capable young lady was teacher of drawing at a salary of $75 per month. She was very successful. She asked that her salary be increased to $80 per month. She received the reply that, much as her loss would be deplored, it was impossible to grant the increase, since that amount "never had been paid in that position." The consequence was that she took another position and the officials began a search for a successor.

After some weeks of search and investigation, it was finally decided necessary to take an inexperienced girl. She was given $75 per month. Following a successful and popular teacher, she unfortunately failed, and her failure was hopeless and complete. The failure was a serious matter, of course, for the young teacher; but how much more serious for the hundreds of children under her care!

For the insignificant sum of $50 per year, the officials were willing to risk giving up a first-class teacher whom they knew to be a success, and to employ an inexperienced one whose work they had no reason to expect would equal that of the former teacher.

The difference between a successful teacher and one who fails cannot be computed in dollars and cents. It can only be computed in the lives of boys and girls that on the one hand have been enriched, inspired and beautified, and on the other have been discouraged, impoverished and, perchance, ruined.

THE DULL SEASON SCHOOL.

As a means for providing opportunities for improvement and promotion in occupations several cities are offering short courses of two or three months' day instruction to persons engaged in seasonal occupations. The courses are given during that part of the year when the workers are practically idle.

The plan has several commendable features. Attendance upon the school does not interfere with wage earning since the persons attending the school would be idle if not in the school. The period of idleness often leads to the formation of habits detrimental to promotion and efficiency. This retrogration is prevented by attendance in the school, and, if the school is of the proper character, the efficiency of the pupils will be greatly increased.

In some respects the plan is superior to the evening school and the four- or five-hours-a-week plan of day instruction. There is not the element of fatigue on the part of the pupil, which is often met in evening classes, and there is no compulsory absence from home during the evening hours. There is not the interruption of regular work which is caused by the five hours a week of day school attendance and the loss of pay, or consequent resentment on the part of the employer. Both employers and employees in seasonal occupations feel that they should be allowed to make the most of the time during which they can work, and that opportunities for improvement should be afforded during the season of idleness.

SIGNIFICANT NAMES.

MUCH confusion has resulted in education from misinterpretation of names.

Subjects have changed character without change of name; subjects have been added under misleading names and divisions of school work have been made under names which fail to signify the purpose.

That there is need of significant names in education is evident in the present confused terms used with regard to the industrial arts.

The term "Manual Training" does not apply to the educational process that still bears the name in the best schools.

The term "Manual Arts" has its bias also and tho more significant than Manual Training, falls short of giving a full measure of significance to work that is conceded to offer mental development as well as discipline.

With all due modesty we suggest the name "Industrial Arts."

There is one term in common use with reference to industrial work in school and out of school that we deplore in its misapplication.

The word "practical" is often used as distinctive of mechanical over mental results.

This we deplore because we believe that the mental is pre-eminently practical.

One other unfortunate term is "pre-vocational" as applied to courses which are preparatory for vocational courses but which are directed to acquaint the pupil with the productive activities in a broad educational sense.

The term implies more emphasis upon bread winning practice than courses planned under the name "pre-vocational" are intended to give.

Courses under this name and designed for the seventh and eighth grades of the common schools have met opposition on the ground that they were vocational courses.

This opposition is largely due to the misleading name.

Perhaps the good word Industrial will serve a purpose here also.

With the danger well in mind of giving away our birth-right, we suggest Pre-Industrial as a substitute for the misleading Pre-Vocational.

We submit that the success or failure of any system of vocational training in the public schools will be determined largely, if not entirely, outside the school. Friendly co-operation on the part of organized labor and on the part of employers with those engaged in the work of organizing the public instruction, is absolutely essential to success. Failure to win this support and friendly co-operation means inevitable failure for the school authorities. These authorities must provide that sort of industrial training that employers and wage-earners jointly demand. No other sort of training will be accepted, and there will be no co-operation in developing any other sort of training.—*New York City Labor Unions.*

To give a thoro vocational training to its young people is a sound financial investment on the part of a nation or state. Its normal outcome is a direct attack upon waste and high cost; it makes a saving in the expense of supervision, brings an advance in wages and productiveness, causes a decrease in the relative burden charge upon each unit of industrial product, and finally and best of all, creates a broader manhood, a better citizenship with larger opportunities. Such an investment in human values is certain to bring prosperity in its train. —*C. J. Merchant, Elmira, N. Y.*

HOW IT WAS DONE!

The purpose of this Department is to present monthly a wide variety of shop projects which have been actually worked out in elementary, high, trade and continuation schools. Contributions are solicited and will be paid for—THE EDITORS.

A LATHE JIG SAW.

J. R. Matteson.

THIS lathe jig saw, if made carefully, will, I am sure, fill a long felt want in any shop that has no band or jig saw. The one shown in the photograph has been used for nearly a year, and works to perfection. It can be used on practically any flat-bed lathe, and could be adapted to other beds.

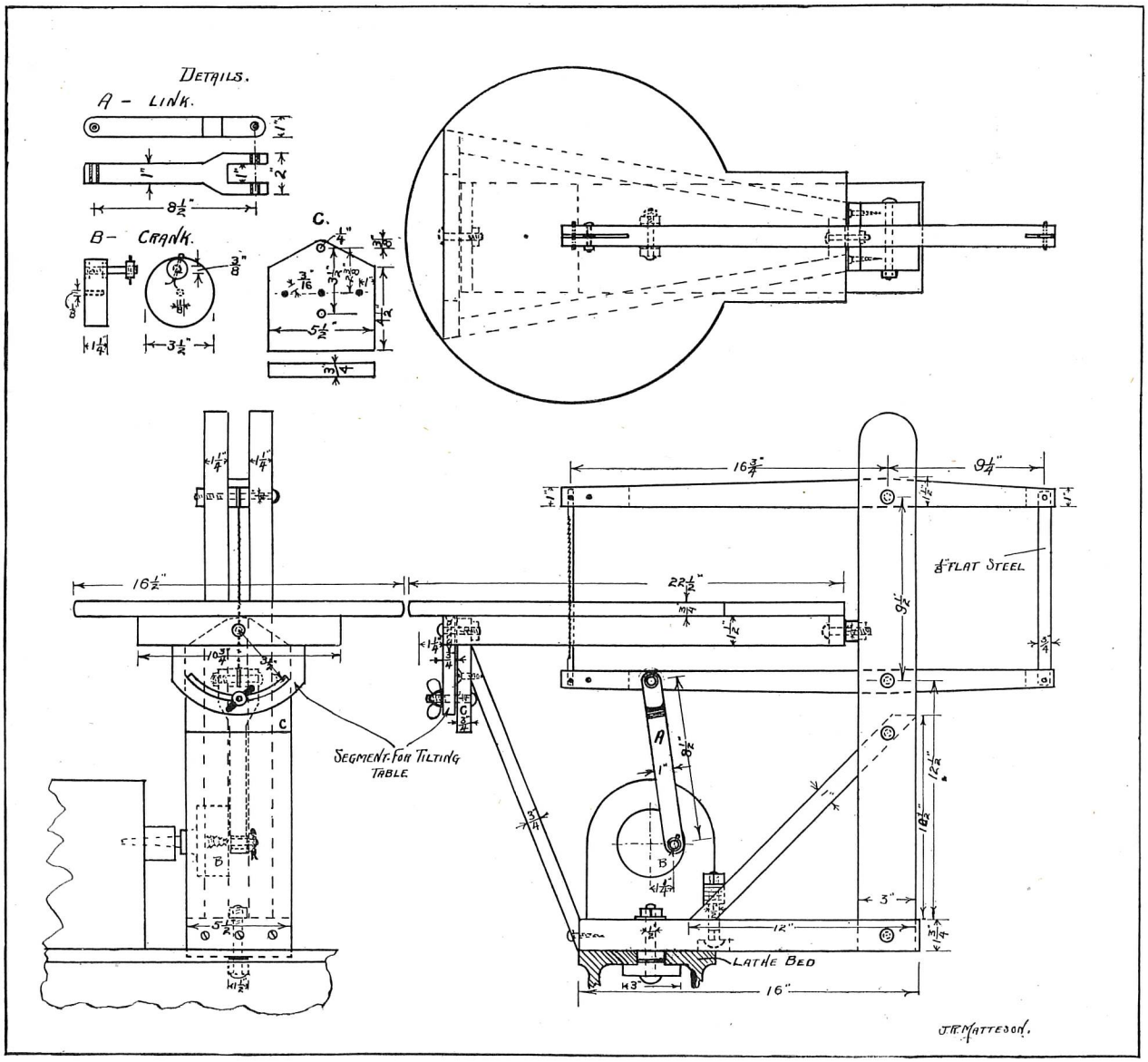
The material to be used in making the saw is oak. As the drawing shows, the base is made of $1\frac{3}{4}$ inch material and supports at the back the uprights which in turn support the saw frame. The saw as designed will take fifteen inches between the saw and frame. Of course that distance could be changed to take larger stock, but it would be at the expense of strength. All joints are bolted and glued. This makes a very substantial construction.

In making the holes in the uprights for the working joints of the saw frame care must be taken to get them exactly in line, or there will be trouble in sawing. There may be several sets of holes to allow for changing saw lengths. In the saw arms bronze bushings may be placed for more durable bearings, altho if well oiled the wood stands up very well. The link, which connects the saw arms at the back, should be of flat steel with sets of holes to correspond with the holes in the uprights. The distance between the upper and lower holes for a certain saw should be at least $\frac{1}{8}$ inch less than the length of the blade so that there will be sufficient spring in the arms to keep the saw tight.

In making the table it is very essential that the supporting frame be very rigid or the table will vibrate when sawing. The curve on the table top is not necessary but adds to the appearance.

The crank as shown in the drawing is made of wood with a carriage bolt for a pin. This assembly is screwed on the screw faceplate. If a more substantial one is wanted it can be made up in a machine shop. The link connecting the crank with the saw arm should have bearings at both ends. The lower saw arm should also have a bearing inserted at the place where the link connects.

When finished the machine may be painted a dull black to match the other machines.



DETAILS OF LATHE JIG SAW.

PIPE SHOP ECONOMY.

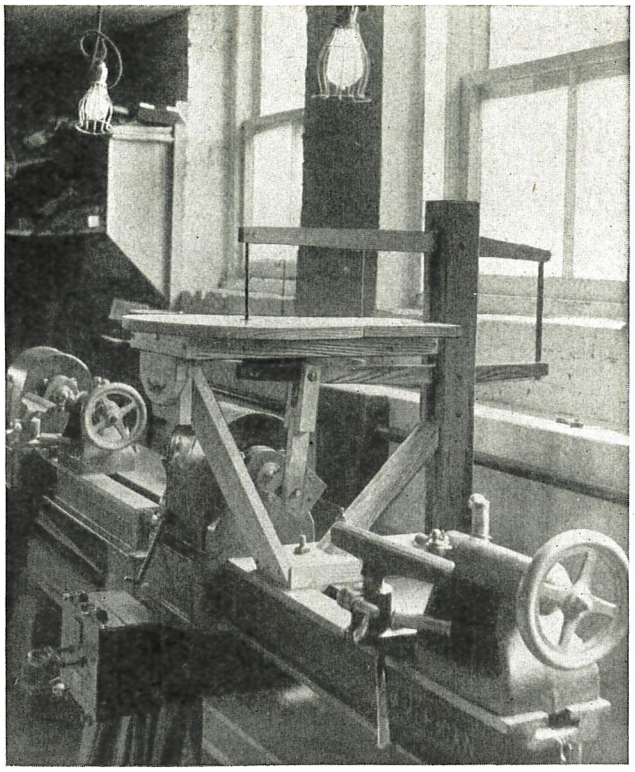
As Practiced in the Milwaukee Continuation School.

C. P. Davey.

IN INDUSTRIAL WORK, such as is carried on in the Continuation Schools, it is sometimes hard to avoid useless waste of materials. In order that this waste might be cut to the minimum the following system was tried during the past five months in the Plumbing Department of the Milwaukee Continuation School, giving exceedingly good results. When working along such lines, care must be taken so that the economy practiced does not hamper the work being done by the pupils.

In the method which follows, the pupils were taught how to cut and thread pipe, how to make simple connections with fittings most commonly used, and finally they were led up to the more complicated hot and cold water supply systems. The materials used were malleable iron fittings and ¾-inch black pipe.

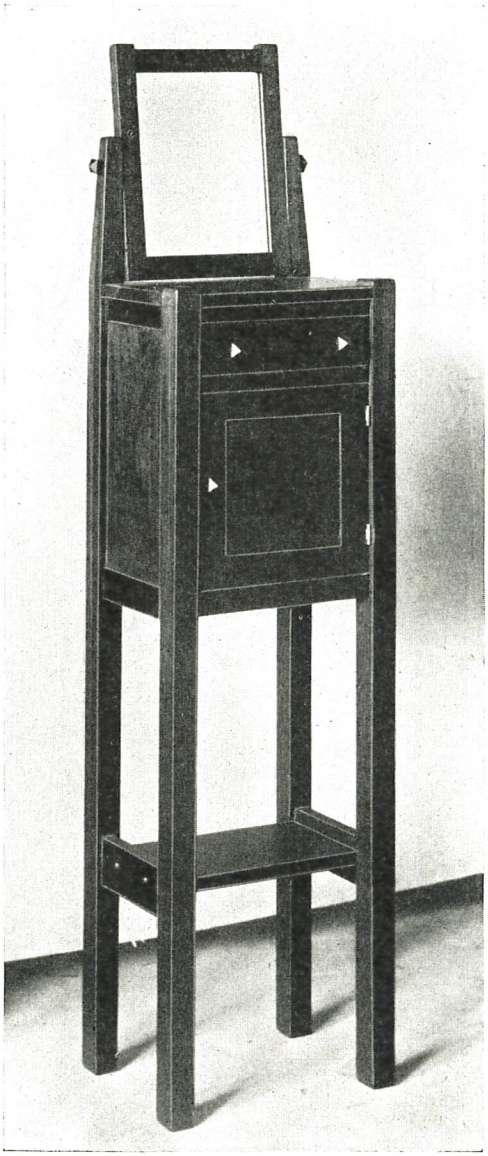
After the fundamental work had been completed and the pupil had become familiar with the more simple terms used in this line of work, it became necessary to furnish him with something more advanced. A series of short exercises was arranged, each covering a two hour period. In constructing these exercises the following difficulties were encountered: lack of space, time, and a useless waste of materials. In order to eliminate these and give the pupils an opportunity to do individual work, the construction was conducted on a smaller scale. The building of taborets, bootblack stands and other useful articles such as is done in the carpenter shop could not be carried on, since it would take the work away from the object of the course. Accordingly recourse was made to the system which follows:



The Lathe Jig Saw in Use.

The pipe was cut and threaded in lengths which permitted of further use. This was done by standardizing the blueprints and drawings of each exercise to the same scale. The lengths of pipe used were 3 inch, 6 inch, 12 inch, 18 inch and 24 inch. These pieces of pipe were subjected to hard usage, each being used about 120 times in a week, and after a period of four weeks the ends became mushroomed and the threads badly worn. A cutting down process was tried in which the larger sizes were cut to the next smaller size. By going over the sizes enumerated above it will be readily seen that this stepping down can be carried on until the pipe has become close nipples. As an illustration, a badly worn pipe 12 inches long can be cut into either three pieces 3 inches long or one piece 6 inches long and one three inches long.

The interest displayed in the work by the pupils proved that the economy practiced did not hamper the work and the practical value of the exercise.



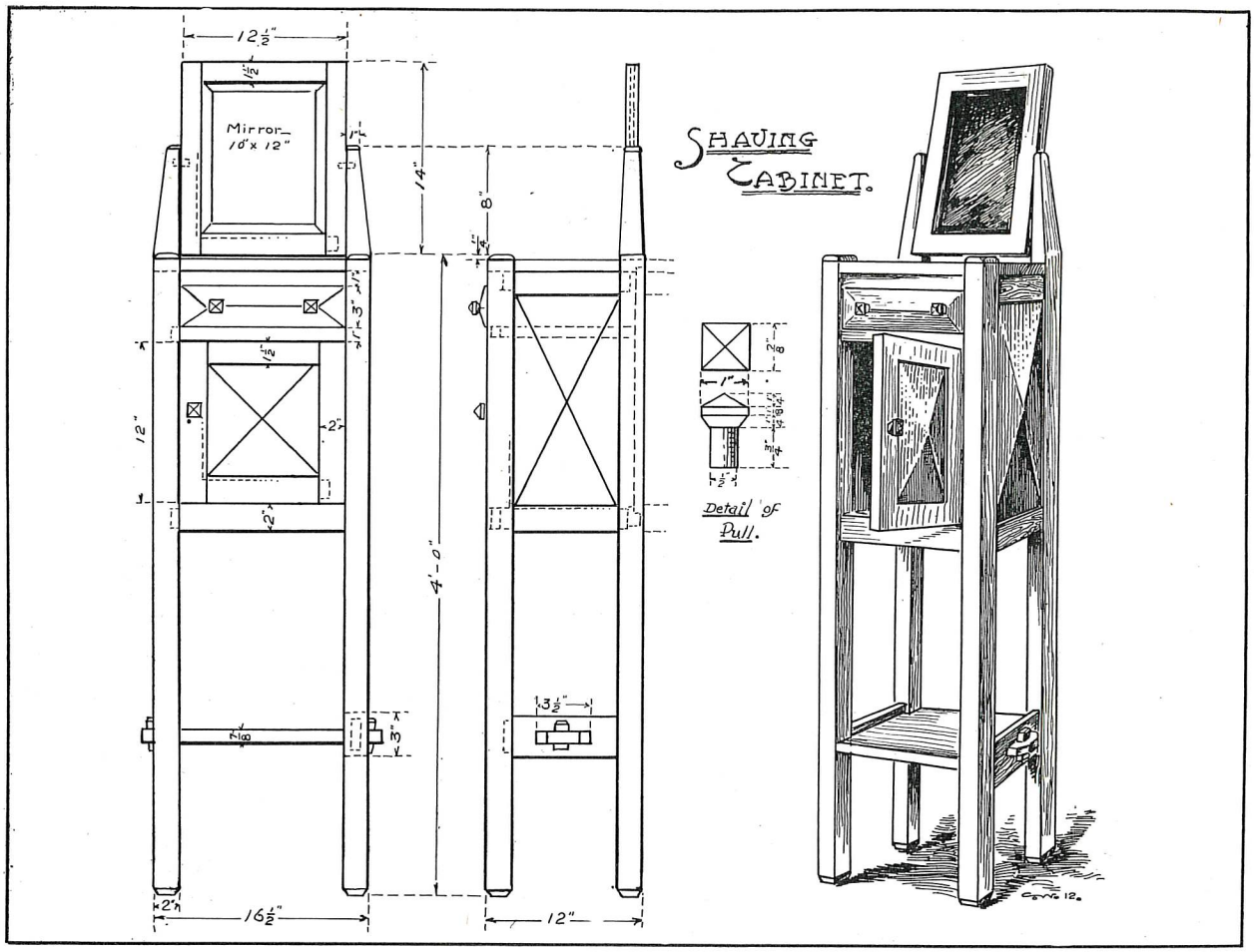
Shaving Cabinet.
(See page 130.)

SHAVING CABINET AND MIRROR.

Clark Woodward, Murfreesboro, Tenn.

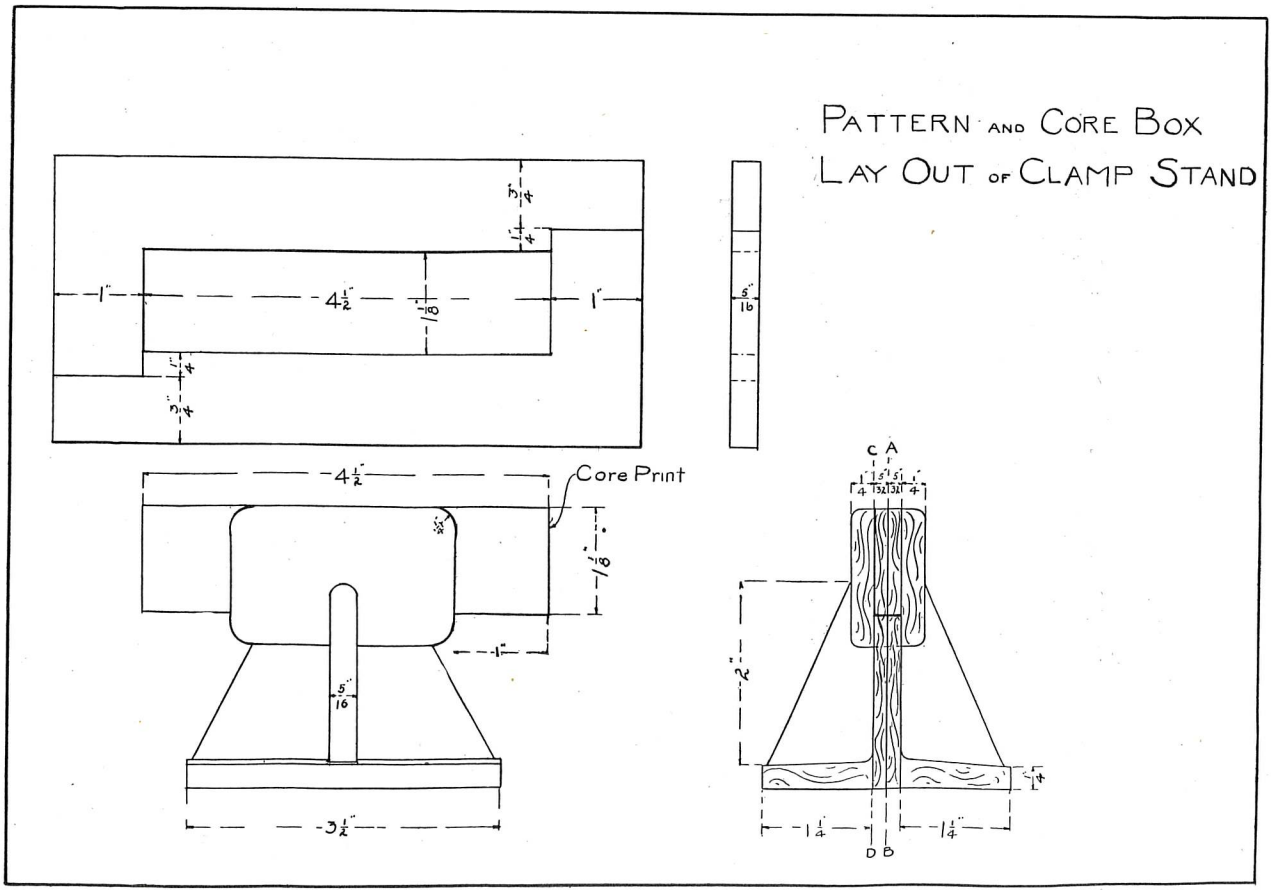
THIS is a valuable problem from more than a constructive point; constructively, it may not be unusual or involve any new processes, the beveled panels in the sides and the door are interesting and add agreeably to the general appearance and vigor of the project. The drawer front is also beveled in the same manner.

This crop of shaving cabinets was made of select black walnut and totaled more than a half-hundred at the finishing. The walnut in finishing was treated with a coat of slaked lime, allowed to remain over night, when it was brushed off with a stiff brush. One coat of oil was added and when thoroly dry three coats of white shellac



SHAVING CABINET.

(See page 129.)



(See page 131.)

were added and rubbed down with mineral wool and pumice stone and oil.

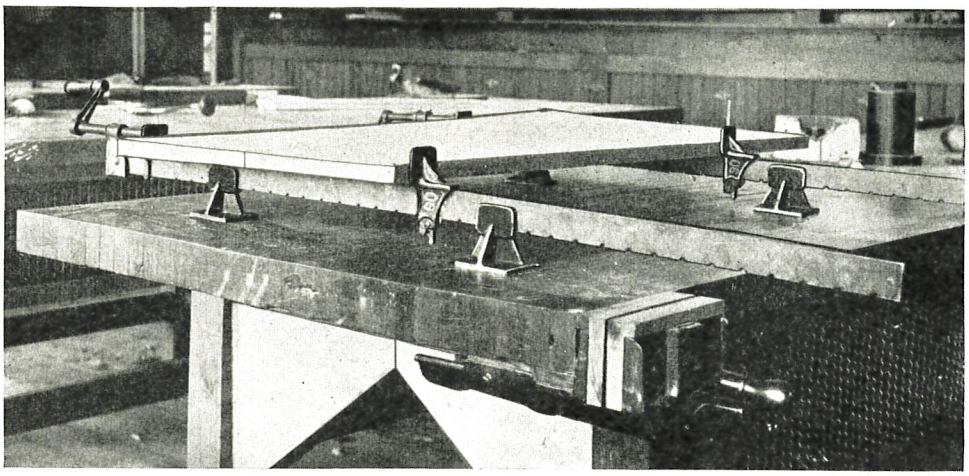
The coating of lime ages the walnut fifty years in a single night.

CLAMP STAND.

P. H. Heron, San Diego, California.

In clamping up table tops and similar constructions there is a tendency for the ordinary carpenter's clamps to tip over, and one person cannot successfully do the work. To overcome this trouble the clamp stand shown in the illustration has been a helpful addition to the shop.

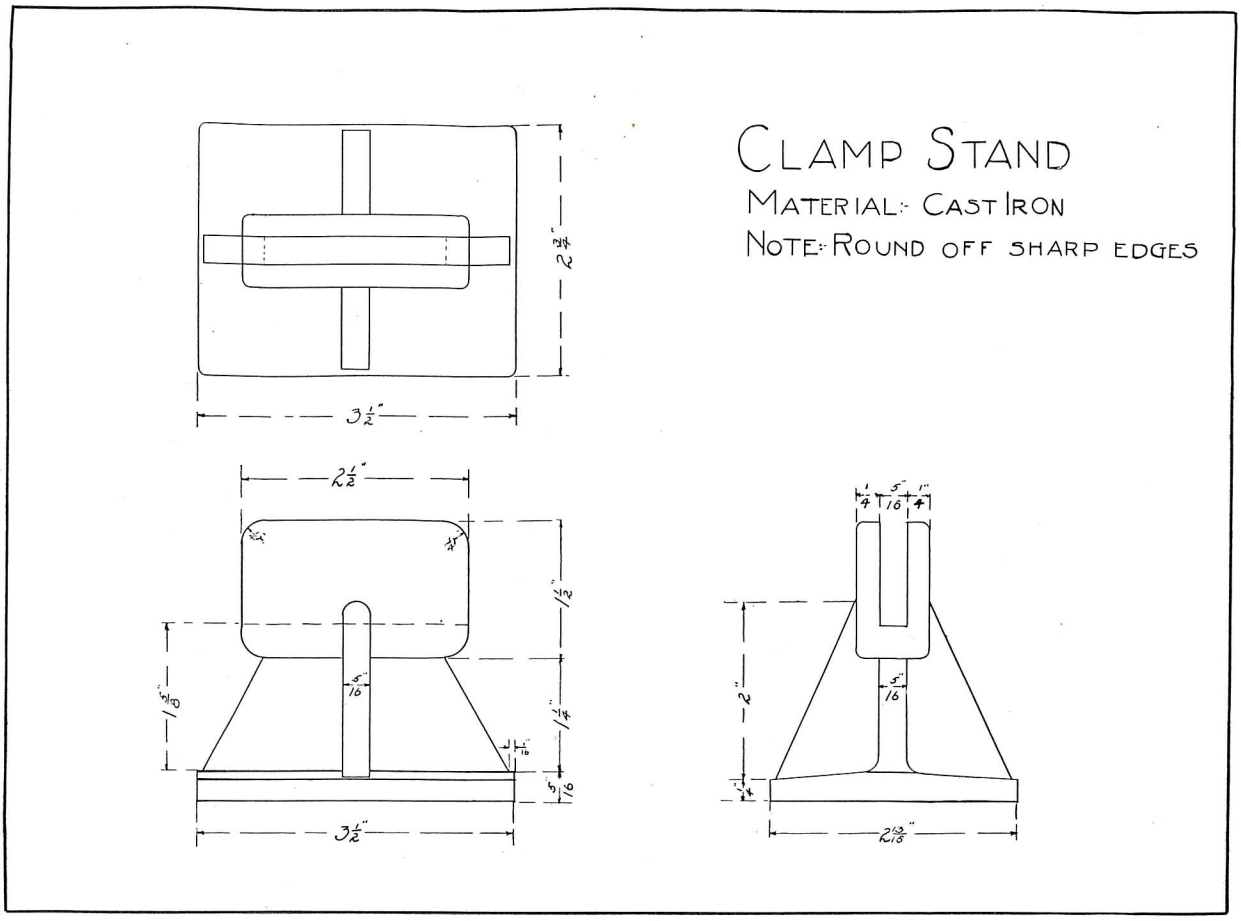
I saw the stand in use for the first time in the University of California shops.

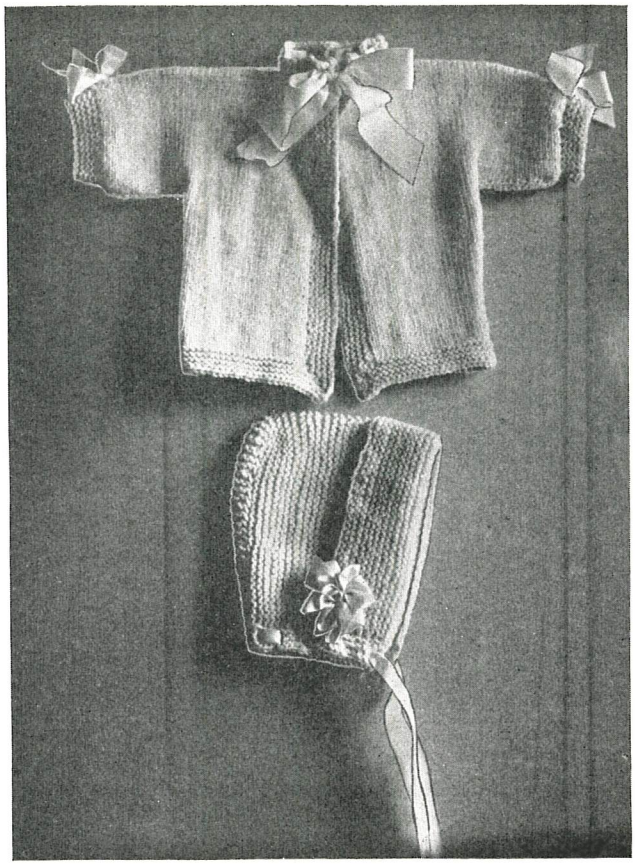


The making of the pattern and core box is a simple matter. The patterns for the stands shown in the picture were made by first semester high school students.

The pattern can be made split thru the center AB or along the line CD. In the latter construction one will have larger pieces of material to work with, as you will note in splitting the pattern thru the center the material will be 5/32 inches in thickness, whereas in parting the pattern along the line CD the material will be 5/16 inches.

The core prints can be placed on or left off. Coring the slot in which to place the clamp will not be as good a job as casting the slot solid and then machining afterwards.

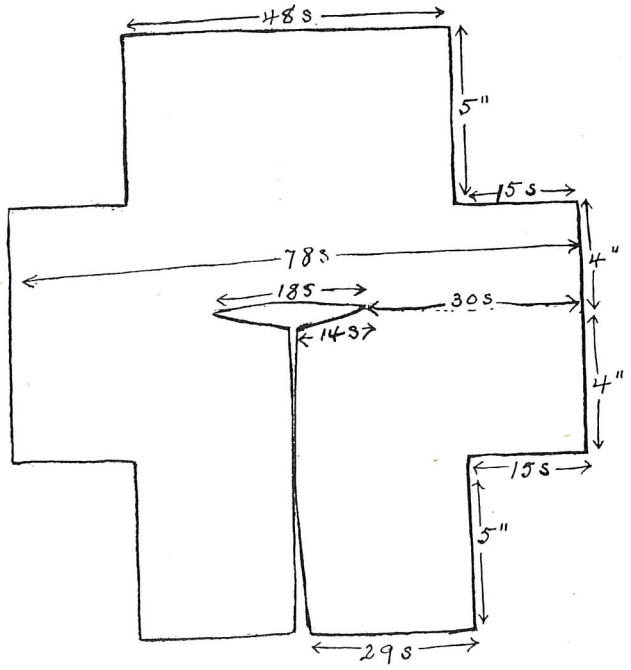




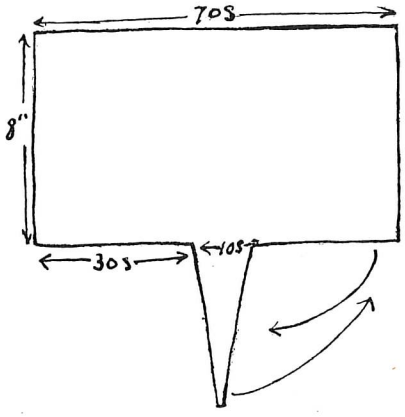
KNITTING.

Sarah McGiffert, Supervisor of Handwork, Muskegon, Mich.

THE BEST TIME to introduce knitting into a handwork course is in the fifth or sixth grade. It is not too difficult to be mastered readily by fourth grade girls. It is a splendid form of manual work, not only for its practical value but for the dexterity, interest and care of materials involved. In the Muskegon schools hundreds of little girls have learned to knit during the past four years, and there is no work more keenly enjoyed. Young children learn very much more readily than high school girls, and once acquired the ability is never lost.



Knitting Diagram for Baby Jacket.



Knitting Diagram for Baby Bonnet.

As soon as the stitch and the correct way of holding the needles are learned, a simple article may be started. The order of teaching the rudiments are, plain knitting, purling (knitting on the back to make a right and wrong side), binding off, and casting on stitches.

Following are directions for two models which are very popular and easily made:

Baby Bonnet.

Materials—1 skein single Germantown. Wooden needles, about 3/16 inch diameter.

Method—Set up 70 stitches, knit plain 8 inches.

Bind off 30 stitches (be sure that 40 are left, including one stitch on the right hand needle). Knit across. Bind off 30 stitches from the other side. This will leave 10 in the center.

On 10, knit 2 inches; reduce 2 stitches by knitting two together at each side, knit 1 inch. Reduce 2 stitches and repeat until strip is long enough to join bound edges.

Fold back 2 inches at front. Pick up stitches around bottom with flap folded back. Knit one row plain, make beading for ribbon or cord; knit 1 inch plain, bind off.

Beading—Knit 2 stitches, knit 2 together and throw yarn over right hand needle; repeat, and in the next row there will be a hole where the stitch was thrown over.

Baby Jacket

Material—1½ skeins single Germantown, ½ skein color for border. Wooden needles if desired, 3/16 inch diameter.

Method—Set up 48 stitches, knit and purl, making right and wrong sides until 5 inches are made. Add 15 stitches, work across and add 15 to the other side for sleeves. On these 78 stitches knit 4 inches. This completes back. Knit across 30 stitches and take them off on a safety pin. Bind off 18 stitches for back of neck. This should leave 30 stitches—29 on left needle, 1 on right. Knit and purl back and forth once and add 14 stitches for front of neck. On the 44 stitches knit 4 inches. From sleeve side bind off 15 stitches, and on the 29 remaining stitches knit 5 inches. Take stitches off needle to safety pin. Put stitches on pin at shoulder of other side back on needle and complete second side like first. Knit border for cuffs of sleeves. Overhand underarm and sleeve seams.

For border, pick up stitches across bottom, adding one stitch each time a corner is reached, and do plain knitting. Make as wide as desired and bind off loosely. Pick up stitches at fronts and add a stitch each time the bottom of the jacket is reached. This will make mitred corners when joined to the border at the bottom.

Pick up border for neck last, so that it will reach across front borders. Make beading before binding off.

BRIEF ITEMS OF INTEREST

MINNEAPOLIS SURVEY MAKING TRADE AGREEMENTS.

The Minneapolis Vocational Education Survey is devoting considerable energy to the perfecting of trade agreements between employes and employers whereby the trades and industries are to support the vocational courses in the Dunwoody Institute and the Girls' Vocational High School. These trade agreements are of several types.

One is an agreement whereby the department stores have agreed to the following:

"In order to insure young people who wish to become efficient salesmen proper training, after employment, and a successful career in the business, the following tentative suggestions are made for the city of Minneapolis:

"1. That the present school of salesmanship in the Girls' Vocational High School continue to receive pupils who have completed at least the work of the elementary school.

"2. That the first three months of a pupil's career in the salesmanship classes be used as a probation period for the purpose of testing the pupil's interest and fitness for salesmanship work.

"3. That the remainder of a full two years' period, consisting of the two full school terms of ten months each, be given to the further training in salesmanship work of the pupils thus selected.

"4. That an advisory committee of six citizens of Minneapolis be appointed by the Board of Education, three of whom shall be employers and three employes engaged in merchandising; the employers on the committee to be appointed from a list of not less than ten approved merchants furnished by the Retail Merchants' Association of the city. The Superintendent of Schools and the principals of the schools in which courses in salesmanship are given shall be members ex officio of the committee.

"5. That the school authorities, aided by the advice and recommendation of the Advisory Committee, standardize the entrance requirements, the equipment, the course of study, the methods of instruction, the testing of pupils, the commercial experience of pupils, etc., while in the school, and the graduation and placement of pupils in the stores.

"6. That upon the completion of two years' training, the pupils so desiring be placed in the stores of the city that are parties to the understanding, according to a plan to be worked out by the school authorities aided by the advice of the Advisory Committee.

"7. That these pupils be placed in the stores on probation for one year, the diploma of the school being withheld until proof of satisfactory work is furnished at the close of one year, provided services are satisfactory.

"8. That these new employes be paid an initial wage of not less than $8.00 per week upon entering the stores.

"9. That, with the assistance of the Advisory Committee, the career or experience of the pupil, including the instruction which she is to receive after entering the store and during the probationary year, be drawn up, charted and carried out by the stores which are parties to this understanding.

"10. That arrangements be made whereby the services of public continuation classes containing not less than fifteen pupils be provided free for those stores desiring such services.

"11. That the stores that are parties to this understanding are to agree that they will use the pupils coming out of this two-year period of training as the stores' source of supply in employing new workers until such supply has been exhausted.

"12. That the understanding shall be subject to change and ratification at the close of each school year."

A second type of agreement provides that the trades and industries of Minneapolis are to accept the boys who complete a two-years' course in the Dunwoody Institute, the first three months of the course to be regarded as a probation period, as advanced apprentices at an agreed wage, the diploma of the school being withheld until satisfactory work is furnished at the close of one year.

The shops that are parties to these agreements are to use the pupils coming out of the two year period of training in the school as their source of supply in employing new workers until the supply has been exhausted.

Advisory committees consisting of employers and employes in the trades are to assist the school authorities to standardize the entrance requirements, the courses of study, the methods of instruction, the testing of pupils, the commercial experience of the pupils while in the school, and the graduation and placement of pupils in the shops and industries of the city. With the advice of the advisory committees, the career or experience of the pupils, including the instruction which they are to receive after entering the shops and during the probationary period, will be charted and carried out by the shops which are parties to the understanding.

Another type of agreement provides that the employers and unions are to require all apprentices during three years of their apprenticeship to attend at least five days a week, an all-day school at the Dunwoody Institute, for two months of the dull season of that trade.

Arrangements are being made with employers so that the apprentice shall give during this dull season one-half the time spent in the school and the employer shall pay for one-half of the time; that is to say, that the apprentice is to receive one-half his usual wages while attending school.

One-half of the time spent in school by the apprentices shall be devoted to the practical work of the trade and one-half to technical and academic work.

A fourth type of agreement provides that both the unions and employers are to encourage and urge attendance of journeymen and apprentices at free evening classes in trade subjects conducted at the Dunwoody Institute.

A fifth type of agreement provides that in trades in which there is no recognized apprenticeship, the unions are to require all apprentices to attend evening classes in trade subjects, and employers are to give preference in employing men, and when reducing their forces, to men attending such classes.

Advisory committees composed of representatives of employers and employes are to be provided for each trade taught in the school. No fees are to be charged for any instruction given in the Dunwoody Institute.

THE OAKLAND CONVENTION.

Mr. Arthur H. Chamberlain, chairman of the Vocational Education and Practical Arts Department of the National Education Association, has issued the tentative program for the Departmental Congress to be held in Oakland on August 26th. The Department will hold three sessions as follows:

Topic—Vocationalizing Industrial Education.

(a) "Art and Its Place in National Growth," Frank Alvah Parsons, President, New York City School of Fine and Applied Arts.

(b) "Home Economics Applied to Life," Miss Martha Van Renssalaer, President American Home Economics Association, Ithaca, N. Y.

(c) "The School Shop in Its Relation to Bread Winning," James Collins Miller, Provincial Director of Technical Education, Edmonton, Canada.

Discussion—Miss Florence Ellis, American Crayon Company, Palace of Education, P. P. I. E., San Francisco. Miss Edna A. Rich, President State Normal School, Santa Barbara, California.

2:00 P. M.—*Topic—Economic Aspects of Vocational Education.*

(a) "Vocational Education and the Labor Problem," Carroll G. Pearse, President State Normal School, Milwaukee, Wisconsin.

(b) "Vocational Education in Its Wider Implications," Thos. M. Balliet, Dean of School of Pedagogy, New York University, N. Y.

(c) "The Social Phases of Vocational Education," Richard G. Boone, University of California, Berkeley, Cal.

Discussion—Dr. E. R. Snyder, Commissioner Vocational Education, Sacramento, California. Chas. H. Magee, Chief, Philippine Public Schools Exhibit, Palace of Education, P. P. I. E., San Francisco, Cal.

8:00 P. M.—*Topic—The Organization and Administration of Vocational Education.*

Charles H. Keyes, President Skidmore School of Arts, Saratoga, N. Y.

Exhibit Room at San Francisco Exposition. Entire furniture, and fittings designed and made by students in the art and manual training departments of the Springfield, Mass., High Schools. Won gold medal.

SCHOOL PAPERS.

THE following school papers which have recently been received are the products of the schools' own printshops. These are interesting reminders of the rapidity with which printing is being introduced into the schools and of the excellent and practical use to which it is put.

THE HABIT, printed by the Salina, Kansas, high school, is one of the largest and best school papers in the country. It regularly has from 32 to 40 pages of reading matter fully illustrated, and sixteen pages of advertising.

CHANCE, a small twelve-page booklet with a flaming red cover, printed in the Fort Wayne, Indiana, Vocational School. It is an interesting and creditable piece of work.

THE NORTH STAR, published and printed by the boys of the North Industrial School, Pittsburgh, Pa. The sixteen pages are full of good material, well composed and well printed. The cover is attractively printed in two colors.

VOCATIONAL PROGRESS is an interesting monthly of eight double-column pages. It is printed by the class in Printing in the Bayonne, N. J., Vocational School.

THE OWL is put out by the Park Ridge, N. J., High School. The composition, makeup and press work are very good indeed.

THE CENTRAL DIGEST, a large, forty-page monthly, printed in the Central High School, Chattanooga, Tenn. It is one of the most pretentious efforts that has come to us. It is printed in large, clear type on superior paper. The heavy cover is attractive both in color and design. The contents are varied and interesting.

THE BULLETIN is a small, neat forty-page monthly put out by the Huntington Park, Cal., Union High School. It is printed on good paper with excellent cover. The cover design is in several colors, printed from plates made by the students.

THE BLUE AND WHITE is the product of a class in Journalism in the Junction City, Kansas, High School. It is well printed and contains 24 double-column pages. The two color cover is very attractive.

THE ORACLE, a 32-page publication by the students of the River Falls, Wisconsin, State Normal School. It has an interesting cover design in red and gilt on soft, white stock. The contents are meritorious, well arranged and well printed.

SAVANNA EDUCATION. This is an especially neat and attractive pamphlet. It is a commercial job, but it contains designs made and hand colored by the pupils in the Savanna, Illinois, schools. Something unique appears in its Advertising Number. This issue is filled with merchants' advertisements which were written by the seventh and eighth-grade pupils.

STOUTONIAN. A weekly paper of "news, knowledge and wit" edited, printed and published by the students of Stout Institute, Menomonie, Wis. Typographically unpretentious, the little weekly is full of high-grade contributions.

The Vocational Messenger. This is a monthly paper of eight large pages, issued in the interest of the Voca-

tional Schools of Albany, New York. It is well printed and carries good halftone illustrations of the various shops.

The Workmaster. Published in the interests of the Pre-vocational Centers of the Boston Public Schools. It is a twenty-page monthly made up entirely of contributions by the boys in the various Pre-vocational Schools.

INDORSE TRADE SCHOOL.

The Minnesota State Federation of Labor, at its annual convention in Winona, on July 20, passed the following resolution:

"Organized labor has not only thruout its entire history supported in every possible way free education for all, but has repeatedly gone on record in favor of industrial education where carried on under conditions beneficial to the individual worker and not injurious to the trade.

"We favor part time and evening classes in such institutions as the public schools and the Dunwoody Institute of Minneapolis giving further training in the theory and practice of the trade to those who are already employed in it as wage earners. We believe that the courses taught in such part time and evening classes should be such as meet with the approval of both employes and employers in the trade, and should be taught by those who have had successful practical experience in the trade.

"Organized labor recognizes that only thru the better education of the youth of the land both in general and trade matters will the integrity and prosperity of the craft be preserved, and that the success of organized labor must continually rest upon a more intelligent body of workers. We therefore favor industrial schools giving preliminary training for advanced apprenticeship in the trades, but we favor such schools only when they are established under such conditions as insure the selection of boys who desire training for the trade, and are willing to take proper training for it, thoro going training by competent and experienced instructors, equipment and course of study that are approved by the trade, the placement of the pupils to continue their apprenticeship in the trade in such a way as not to disturb the conditions in the trade, and the withholding of the diploma of the school until the pupil shall have done satisfactory work in the trade.

"We believe, further, that most of the training for the trade will be done by the after-training thru part-time and evening classes, of workers already employed in the trade. In order to insure the practicality of all instruction relating to any trade, the school authorities should in each and every case be aided by the advice and assistance of an advisory committee in which the local union for the trade should have representation. We recognize that industrial education has come and come to stay, and believe that in every community organized labor should take an active part in shaping the policies of all industrial schools and classes in order that the problem may be handled in a constructive way."

BOOK REVIEWS.

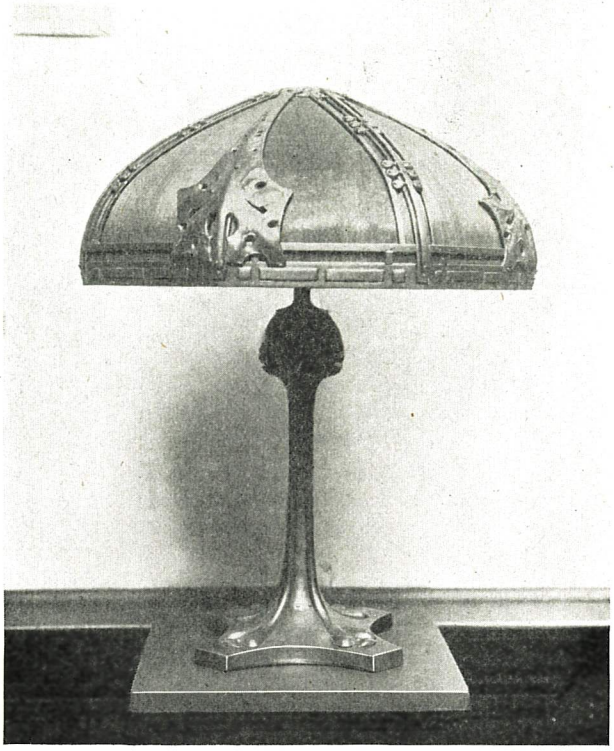
The Pure Food Cook Book.

Edited by Mildred Maddocks. Introduction and notes by Harvey W. Wiley. 417 pages. Price, $1.00, net. Hearst's International Library Co., New York.

The fight for pure food has been waged for a third of a century. The present book has been written with the purpose of combining the pure food idea in a school textbook. The book teaches children the proper selection, preparation and use of food so that they may prepare meals that will be nutritious and economical.

There are chapters on the making of different kinds of bread, pastries, soups, on the preparation of puddings, deserts, jellies, preserves, salads, on the cooking of fish, vegetables, eggs, etc., etc.

An interesting feature of the book are the blank pages at the end of each chapter which can be used for recording the pupil's favorite recipes. Inexpensiveness is made a feature thruout the book altho there is a fair proportion of more elaborate dishes.



Copper Lamp shown at Chicago Craftsmen's Exhibition.

Vocational Education in Europe.

By Edwin G. Cooley. 347 Pages. The Commercial Club of Chicago.

This report describes observations and experiences in European vocational schools made by the author during the winter of 1913-14. It is a continuation of the earlier report, by the same author, in which he emphasizes the importance of supplemental welfare work for young persons in attendance at vocational schools. This volume supplements the earlier observation and experience, especially in regard to agricultural schools of lower grade. This report contains detailed descriptions of the agricultural instruction in Denmark, Ireland, Holland and Germany, of vocational guidance in London, of welfare of working youths in Germany, of industrial instruction in Ireland. Considerable attention is devoted to the work of Bishop Grundtvig and the People's High Schools.

Persons desiring authentic information on these points will welcome the appearance of this second volume by Dr. Cooley.

72 Useful Lumber Tables

L. H. Alberty. 80 pages. Price, $1.00. Published by L. H. Alberty, Winfield, Kans.

This volume gives tabulated answers to 20,736 problems in the number of board feet and the total cost of lumber of any size and at any cost up to twenty cents per foot.

As a ready reference for teachers, lumbermen, carpenters, etc., it is both a time saving and an error saving device. It will undoubtedly find a welcome among such people.

Some Facts Concerning the People, Industries and Schools of Hammond, Ind. By Robert J. Leonard, Indiana University. Published by the board of education of Hammond. This pamphlet is a study of industrial and educational possibilities of an industrial community and contains suggestions for a comprehensive scheme of industrial education.

NOW, ARE THERE ANY QUESTIONS?

Readers are urged to ask questions concerning the Industrial Arts. The editors will reply to those questions which they feel that they can answer, and to other questions, they will obtain replies from persons who can answer them authoritatively. Questions should be addressed to THE EDITORS.

Manual Training Supplies.

Chicago, Ill. Q:—(1) In case material is furnished thru the school, should the pupil be charged a certain fixed amount for waste, or should he be charged for the actual amount of stock used and the waste thereof? (2) What methods may be used in the woodworking course for the economy of lumber and supplies?

A:—(1) It would seem best to have each pupil keep a stock card and pay for all materials used in projects which become his. (2) Keep an active inventory sheet or card at each stock or supply case or rack. Upon this have each individual record of material taken and strike a balance. Have him also keep similar entry on his own stock card. Have racks or other receptacles for short or "waste" material. Talk economy and plan for it by explaining how to select, cut and use stock.—*F. D. C.*

Architectural Drawing Books.

New York, N. Y. Q:—Please give me the names of books of help to one who intends to teach the subject in a high school?—*S. L.*

A:—For your purpose, *Greenberg & Howe's Architectural Drawing,* published by John Wiley & Sons, New York City, price, $1.25; and *Howe's Architectural Drafting,* also published by John Wiley & Sons, price, $1.25.

The Radford Architectural Company of Chicago, has a number of splendid books on building and architecture which you should read with profit. The book department of the National Builder, David Williams Company, New York City, will also be helpful in picking out books for general reading.

Grass Matting.

Schofield, Wis. Q:—Where may the grass matting used for covering chests and boxes, be obtained?—*A. C. H.*

A:—Deltox Grass Matting Company, Oshkosh, Wis.

Bird Houses.

Brewer, Me. Q:—Can you put me on the track of something giving information for the construction of Bird Houses?—*E. H.*

A:—The following books will be helpful:

Bird Houses and How to Build Them. By Ned. Dearborn. Farmers' Bulletin 609, U. S. Department of Agriculture. Issued in September, 1914, and revised in February, 1915.

Bird Houses. Praktischer Vogel Schutz. By W. R. Eckardt. Published in Germany. May be had thru E. Steiger & Co., New York, N. Y.

Useful Birds and Their Protection. By E. H. Forbush. (Bird Houses and Nesting Boxes.)

Handicraft for Handy Boys. By A. Neely Hall. Lothrop, Lee & Shepard Co., Boston. Price, $2; prepaid, $2.25.

Harper's Outdoor Book for Boys. By Joseph H. Adams. Harper & Bros., New York.

The Birds and I. By L. H. Bailey. Issued by the College of Agriculture, Cornell University, Ithaca, N. Y.

Iowa Boys' and Girls' Club No. 8. Manual Training, Part II. Published by the Agricultural Extension Department, Ames, Ia.

Manual Training for Rural Schools. Quarterly Bulletin of the Milwaukee County School of Agriculture, Wauwatosa, Wis. Vol. 4, No. 4, February, 1915. Prepared by L. M. Roehl, Wauwatosa, Wis.

Ornamental Initials.

Masterton, N. Z. Q:—I would like you to tell me the title of any books on Ornamental Initial Letters. I believe there are one or two dealing with capitals only, possibly in colors.—H. D.

A:—*Prang's Standard Alphabets,* L. Prang & Co., Boston.

Primer of The Art of Illumination, by F. Delamotte, E. & F. N. Spon, Pub., 16 Bucklersbury, London, England.

The Art of Illuminating, by Tyrnns & Wyatt, Day & Son Limited, Pub., 6 Gate St., W. C., London, England.

These are all old books and may be out of print. We consider Prang's the best of the three.

Two other good books on lettering are Strange's Alphabets and Day's Alphabets Old and New. The latter books may be obtained from the School Arts Publishing Co., Boston.

Books on American Woods.

Rock Springs, Wyo. Q:—Where can I get a good book on American woods? I wish it to take up the growth of the timber and where found, lumbering, curing and sawing, and the use of the different woods.—*R. R. C.*

A:—*Wood and Forest.* By William Noyes. Cloth. 309 pages. Price, $3. The Manual Arts Press, Peoria, Ill.

Handwork in Wood. By William Noyes. Price, $2. Published by the Manual Arts Press, Peoria, Ill. (A treatise of logging, saw-milling and common uses of wood.)

Handbook of the Trees of the Northern States and Canada. By Romeyn B. Hough. Price, $6. Published by the author at Lowville, N. Y.

The Principal Species of Wood. By Chas. H. Snow. Price, $3.50. John Wiley & Sons, New York City.

A Primer of Forestry. By Gifford Pinchot. Published by the United States Department of Agriculture, and may be had gratis thru your congressman.

Handbook of the Trees of the United States and Canada, East of the Rocky Mountains. By R. B. Hough. Published by the Author at Lowville, N. Y.

North American Trees. By N. L. Britton. Price, $7. Published by Henry Holt Co., New York City.

American Woods. By R. B. Hough. Eleven volumes, including a collection of 275 mounted specimens. Price, $55. Lowville, N. Y.

Rush Seating.

Madison, Wis. Q:—Can you tell me where I can obtain instructions for the rush seating of chairs?—*R. F. G.*

A:—In the October, 1914, INDUSTRIAL-ARTS MAGAZINE, there appeared an article on "Rush Seating by Mr. L. Day Perry, which describes the process quite fully. Other good references which will be found helpful are:

Domestic Jobbing. By Paul N. Hasluck. Cassell & Company, London, New York. (Contains chapter on Chair Caning.)

How Rush Seats Are Made. By Louise Shrimpton. House and Garden, August, 1910. Price, 25 cents. McBride, Winston & Co., New York.

How to Cane, Rush and Put Leather Seats in Chairs. By Elisabeth Saugstad. Keramic Studio, Vol. 5, No. 12, April, 1904. Syracuse, N. Y.

LOS ANGELES, CAL. The Los Angeles Teachers' Club has lost a good share of its membership thru the withdrawal of the manual training teachers and the formation of a separate manual-arts association. Thru association with the main teaching body, the manual training teachers were unable to accept members who did not belong to the former and were restricted in their efforts to expand. The new body will be able to accomplish better results thru the enlargement of its membership and the enthusiasm of numbers with a single purpose.